International Journal of
Orthodontia and Dentistry
for Children

(All rights reserved)

VOL. 21 SEPTEMBER, 1935 No. 9

Original Articles

GROWTH OF THE JAWS AND THE ETIOLOGY OF MALOCCLUSION

ALEXANDER SVED,* B.S., D D.S., NEW YORK, N. Y.

CHAPTER I

INTRODUCTION

Science proceeds by a controlled use of the imagination applied to preliminary data, whereby provisional hypotheses are formed; such provisional hypotheses may be of enormous value as guides to investigation, even though they may subsequently prove to be inadequate or false.—Brash.

THE practice of orthodontia has been greatly influenced by several extensive studies, the results of which were presented to the profession within the last decade. Each of these studies or investigations, while complete within its scope, dealt chiefly with a particular phase of the broad orthodontic problem. For this reason, the several conclusions arrived at stand somewhat dissociated from the generally accepted facts; and, although a direct relationship is recognized, the exact place of these conclusions in relation to the rest of our knowledge has not been definitely established.

Theories, which inevitably arise from such investigations, serve only in few practical instances. They remain theories, and their practical application is greatly limited. In order to justify the acceptance of theories or conclusions drawn from investigations, their usefulness in practice must be made evident; for the ultimate aim of all scientific studies is to establish facts of practical value. The study of the growth of the jaws and of the etiology of malocclusion is only a part of the great orthodontic problem, which has many ramifications. Growth and etiology may be studied from different angles, and on account of the differences in points of view and special concepts, the resulting conclusions will correspondingly differ. Thus one investigation may

*Chief of Orthodontic Clinic of the Hospital for Joint Diseases.

be focused on the "normal growth processes," which will disclose the changes responsible for jaw enlargement. Another investigation may deal with the normal physical manifestations of these changes; while still another study may have for its object the determination of the effects of injurious influences on the growing individual. Independent endeavors in these directions are of great value, but the interpretations of the data thus obtained often contain inconsistencies, which in the light of a special concept seems logically acceptable. A proper correlation of facts from the independent studies will eliminate many such inconsistencies, and in several instances differences of opinion will disappear.

The factors held responsible for the malformations of the jaws and the malocclusions of the teeth are numerous, and extensive statistical data are available. The conclusions drawn from these are not convincing, for in practically all instances they involve the presence of *associated conditions.* Usually one condition, or a group of conditions, is assumed to be responsible for another. From a scientific point of view such a procedure is not permissible. It still remains to be shown that the secondary condition, which is presumably caused by the primary condition or a group of conditions, cannot exist without the presence of the primary group; and also whether the entire picture presented is not due to still another cause, which in the course of investigation had not been recognized. A classic example of this is the assumption that mouth-breathing due to enlarged tonsils and adenoids is responsible for certain types of malocclusions. This assumption may or may not be true. The fact that these conditions are often associated with a particular kind of malocclusion does not prove that enlarged tonsils and adenoids produce that deformity. The probability still remains that both the malocclusion and the adenoid enlargement are caused by some other influence, which we have not been able to trace.

The problem of the etiology of malocclusion is intimately connected with the growth and development of the jaws. During growth, the developing individual may be subjected to injurious influences, and if malocclusions can be caused, they must necessarily be brought about by such injurious agents. But the mode of production of malocclusions and jaw deformities, is a problem separate and distinct from the problem of etiology. The study of etiology involves the recognition of those influences which may have an injurious effect on growth, and it is based on the assumption that *malocclusions are caused by such injuries.* Without this assumption there can be no etiologic inquiry. The study of the mode of production, or genesis of malocclusions and jaw deformities, depends upon a thorough knowledge of the normal growth mechanism, and the alterations of the growth processes brought about by the action of injurious agents. These alterations in the processes of growth must occur if malocclusions are the result of general injurious influences, and they represent *an interference* with growth and development, which manifests itself in relative deficiencies and excesses in the related parts of the masticatory apparatus.

At present it is definitely established that a complex mechanism presides over the processes of growth. It is probable that alterations in the growth processes occur as a result of disturbances within the controlling mechanism itself, and that the deformities are the ultimate manifestations of these disturbances. It is equally probable, however, that malformations develop from a direct injury to the growing tissues, which may be permanent or may persist for a longer or shorter period. But whatever the mode of interference may be, the processes of growth must undergo changes under the influence of injurious agents; otherwise malformations cannot develop. The nature of these changes is not well understood, but we are in the possession of valuable information regarding the behavior of tissues thus affected, which enables us to understand better the mode of production of jaw deformities and malocclusions. From the etiologic point of view it does not make any difference whether the injurious influences inflict a direct injury upon the growing tissues, or whether the resulting deformities are caused by disturbances of the growth-controlling mechanism (endocrines). From the therapeutic standpoint it may make a great deal of difference. For our present purposes, however, it is sufficient to recognize that, apart from malformations which are primarily inherent in the individual from the time of conception, deformities are the results of injuries of a general or local character.

In order to avoid speculative hypotheses regarding the mode of formation of malocclusions and malformations of the jaws, it becomes necessary to examine critically the available facts concerning growth and development. The proper correlation of these facts is the basis upon which an acceptable hypothesis will be formed which will immediately be elevated to the rank of a theory by abundant evidence from investigations not primarily designed to confirm the hypothesis. An established theory will point to a better understanding of etiology and a more thorough knowledge of the factors influencing prognosis. The hypothesis will be formulated upon facts derived from generalized investigations dealing with different phases of growth. The work of Prof. James C. Brash on the *Growth of the Jaws,* together with *Variations in the Form of the Jaws,* by J. Sim Wallace, is adopted in this work for the study of *normal growth.* The brilliant and convincing experiments of Brash on madder fed pigs definitely establish the directions and sites of maxillary and mandibular bone growth. The observations of Wallace on the same individual for twenty-four years, enable us to estimate the lateral changes in the dental arches from childhood to adulthood. From the reinterpretations of Hellman's measurements of the human face, the rates at which growth changes occur will be accurately determined.

The most logical method of approach to a satisfactory explanation of the effect of injurious influences on the growing individual, is given by the theories of Murk Jansen on the *feebleness of growth.* While his theories are not generally accepted, and are regarded as highly speculative, the conclusions of Brash and Hellman definitely confirm the *fundamental laws of feebleness.*

The work of Wallace will be taken up first, followed by the description of the experiments of Brash, and the measurements of Hellman. The work of Jansen will be given in sufficient detail to explain his theories. For a correct statement of conclusions, the authors are freely quoted, and the most important part of their work is given in their own words.

(To be continued)

ORTHODONTIA AND THE GENERAL PRACTITIONER

FRANK M. CASTO, D.D.S., CLEVELAND, OHIO

INTRODUCTION

UNDER present-day economic conditions, decreased earnings have caused many general practitioners to endeavor to supplement their incomes by practicing orthodontia. According to a survey made by the Committee on the Cost of Medical Care of the American Dental Association about five years ago, more than twenty thousand dentists were engaged in this work, and it is likely that this number has been considerably augmented since, so that now more cases of malocclusion are being treated by general practitioners than by orthodontists. With more than half of the children in the country in need of orthodontic treatment, it is necessary and commendable that the general practitioner should undertake some of this work. There is then no criticism of the dentist's treating malocclusions if he is trained and qualified to do the work.

I shall endeavor to point out briefly some of the more important factors which must be considered by the orthodontist or the general practitioner before he begins treatment. The extent of one's knowledge regarding these factors will determine the measure of success one will attain in the treatment of malocclusions. The summary, it is hoped, will help those who may be considering the advisability of doing orthodontic work, to decide in their own minds whether they are qualified to render competent service in this specialized field of dentistry.

There are two distinct phases or divisions in the science of orthodontia—the biologic and the mechanical. It is interesting to note that throughout the entire early period of the development of orthodontia as a specialty, the outstanding investigators in the field considered the biologic phase as the more important—the mechanical devices were looked upon merely as a means to an end. It is, of course, now realized that the biologic and the mechanical problems are so interrelated and so closely connected that a clear conception of both phases is necessary if the results are to be satisfactory. A study of the biologic problems will reveal the facts upon which diagnosis and prognosis must be founded. Diagnosis and prognosis in turn are the factors which determine the method of procedure and the type of appliance which must be used in treatment.

In the biologic field there are many factors which merit careful attention and study. The more consequential of the considerations are development and growth, heredity and environment, etiology, diagnosis, and prevention. The importance of a clear conception of the influence of each of these factors as related to orthodontic therapy cannot be overemphasized.

Read before the California State Dental Association, Oakland, Calif., April 9, 1935.

DEVELOPMENT AND GROWTH

It must be realized at the outset that the tissues and structures with which we are concerned are not separate entities, but integral parts of the organism as a whole. It is now generally recognized that the somatic or body cells have a maximum potentiality, as to both size and number, and that the attainment of the full expression of this potentiality will depend upon a favorable synchronization of all growth factors. It is believed that there is a considerable range between the minimum and the maximum in growth. It does not follow, however, that all parts of an individual will deviate in the same degree from either of these extremes. The different parts and the structures of the body may themselves vary in the degree of growth attained. That is to say, each of the cells of a given structure has what may be termed a potential growth. The minimum is the stage of development which the cell must reach to be a living organism. The maximum potentiality, on the other hand, is dependent upon a number of factors. Axiomatically one may perhaps say that the size, contour, and general character of a structure are determined by the average of the development of its component cells.

For example, if the average of the development of the cells composing the maxilla reaches a stage which we shall arbitrarily call normal, then the average of the growth of the component cells of the mandible must be exactly the same or there will be a disparity between these related parts. The rule may be generally stated as follows: The degree of disparity between two related structures is proportional to the variation between the mean of their respective cell development. The above proportions are true whether the consideration is the relationship between correlated structures or between a single structure and the organism as a whole. These laws apply from inception to full maturity of the individual. When one realizes that in man this growth process extends over a comparatively long period of years, the opportunities for the introduction and operation of factors which tend to interfere with the fine balance and correlation necessary for perfect growth are readily evident. Considering the intricacies and complexities of the processes of life, disharmony between structures and the prevalence of morphologic deformities should not seem unlikely. In fact, disparities and defects are the rule rather than the exception.

When considering disparities in the jaws, teeth, and contiguous parts, one must not forget that the cause of the condition may have its origin in some remote part of the body and that associated structures being similarly situated may exercise a material influence upon them. There is a comparatively wide variation in the growth of anatomical structures at certain ages in different individuals. Likewise, there are remissions in the periods of growth of different structures and the remissions do not occur at the same time. Thus, what may appear to be a disparity in harmony between related structures at certain ages may in the process of further growth become corrected and properly correlated. So great may be the variation in two individuals of the same age that it is often difficult to determine, at least before a certain period of growth, whether a permanent abnormality actually exists. It is incorrect to assume that at any definite

period during the process of growth of the jaws and dental arches they should conform to arbitrary specifications which one could apply to an adult. Equally erroneous is an assumption that at a given stage in the process of development the jaws and dental arches should have, as regards size, proportion and position, a definite fixed relationship which will determine the normal maturity. In short, the factor of variance in growth and development is a highly important consideration. It must be said with emphasis that treatment should never be begun without considering this factor and should never be based merely upon the fact that there is disparity in occlusal relationship.

HEREDITY AND ENVIRONMENT

The effect of heredity in producing malformation of the jaws and malocclusions of the teeth has been a controversial question for many years. There is, moreover, no present indication that the question will ever be definitely settled.

A few years ago a certain group of orthodontists was led to believe that hereditary influences played no part in the development of malocclusions. Their teaching was taken so seriously that all accepted biologic opinion on the subject was ridiculed. LeRoy Johnson states, "More than any one thing, the exclusion of the concept of heredity has been responsible for much of the inadequacy of orthodontic treatment." The problems in connection with heredity in the human organism are varied and complex, but the recognized inherent tendency of an organism to produce in its descendants certain peculiar individual characteristics of itself is a propensity which merits careful consideration before the whole theory is disregarded.

From my own observation and clinical experience over a number of years, the cases of malocclusions which offer the greatest resistance to treatment and in which it is most difficult to attain and retain a satisfactory result are those types in which a strong inherent influence seems to be present. For example, some types of Class I and Class III (Angle classification) show this influence. In some cases it happens that there is a disparity in the amount of tooth structure between the maxillary and the mandibular teeth, which causes a lack of harmony in the occlusal relation. Since most biologists maintain that the size and design of the teeth are among those structures predetermined by heredity, and there are examples of similar characteristics in succeeding generations, their contention would seem worthy of consideration.

Although the extent of the influence of environment is also a controversial question, biologists generally agree that a developing organism may be greatly affected by the environment in which it lives. Like the jaws and teeth which cannot be so separated from the organism to exempt them from the influence of heredity, it may well be that environment, which is a concomitant and necessary factor in life, also is closely related thereto and exercises an equal influence. Though it may not always be clear just to what extent heredity or environment influences malocclusions, it is not safe to say that either can be wholly disregarded as a factor.

ETIOLOGY

The causes of malocclusion are of primary importance in the consideration of treatment. The development of the human denture and its associated parts extends over a long period of time. It has its beginning early in fetal life and is not completed until maturity. The denture consists of many parts, some of which are developed from different structures. During the entire period of growth each unit is subjected to the influence of heredity and environment. If the normal is to be attained by nature, then these influences must be favorable and all the factors in growth must be synchronized. If an inherent force is present which cannot be changed or if an unfavorable condition arises and is allowed to exist, there will be a discordant influence among the growth factors which will produce some form of abnormality. The degree of the deformity will depend upon the severity of interferences with the normal physiologic processes of growth.

For the sake of discussion, the causes of malocclusion may be divided into predisposing and exciting. Frequently, however, these may be so closely interrelated that a differentiation is extremely difficult. McCoy states: "Predisposing causes of malocclusion include all conditions, influences, diseases, or agencies which interfere with the factors governing normal growth processes, and thereby render bodily parts susceptible to alterations of structure, function, and malgrowth. The direct or exciting causes are those conditions, influences or events which specifically add the final impetus in directing the maldevelopment and malocclusion." We must bear in mind that the structures with which we are immediately concerned are integral parts of the whole organism and cannot be segregated from it for the purpose of exemption from hereditary influences and constitutional disorders. The predisposing causes of malocclusions are far reaching in their influence and are in most cases very difficult to detect. Each one is practically always supplemented by another, and usually complex combinations are formed. Their presence or activity may be evidenced only in a minor degree in early years but become more and more pronounced as development progresses. These causes may be completely hidden at certain ages in the functioning of such an intricate, complicated, and delicate mechanism as the human organism, yet they will be manifested ultimately in an incoordination of function.

Hereditary traits and influences are frequently mentioned as the most important of the predisposing causes. Congenital defects produced by malnutrition, maldevelopment and accidents are not infrequent causes. Deficiency diseases and all forms of constitutional disorders may exert a definite detrimental influence in cell metabolism and normal glandular balance and thus produce abnormalities. There are a host of exciting causes, some of which are amplified by the inherent influences. I wish only to call attention to a few of the more common local causative factors: abnormal muscular habits, sucking habits, adenoids, mouth-breathing, enlarged faucial tonsils, abnormal frenum labium, premature loss and long retention of deciduous teeth, loss of permanent teeth, and particularly of the first molars, transposed, missing, and supernumerary teeth, accidents and improper dental restoration. Most of these causes do not

occur singly but in various combinations. It is my opinion that the causes of malocclusion are not taken seriously by the majority of dentists who are attempting to treat them. This may also apply to some orthodontists. This statement is not made with the object of casting reflection or criticism upon those who are endeavoring to render a conscientious service, but it does hold true according to the observation of many orthodontists and is due, no doubt, to a lack of knowledge in this phase of practice. It is quite clear that if the causative factors are not, or cannot be, removed, the prognosis and treatment of a case are very doubtful.

DIAGNOSIS

Diagnosis is the recognition of disease as distinguished from its symptoms. It implies further that a decision has been reached by means of deductions from incidents pertinent to the case. An orthodontic diagnosis is a diagnosis made after a consideration of all factors which may in any way affect a given instance of malocclusion. When making a diagnosis all the available knowledge upon the subject should be utilized. Conclusions founded upon this utilization are the basis for the administration of the various therapeutic agencies.

The following statement is made by McCoy in his book, *Applied Orthodontia*. "The diagnosis of malocclusion implies first, a determination of the character and degree of abnormality present. Second, a careful study of all conditions having a direct or indirect bearing upon its etiology, with an effort to determine whether or not the cause or causes are still operative. Third, the extent of the changes necessary to restore the parts to normal function."

To this I would add a careful search for any biologic factors or mechanical forces that may influence orthodontic treatment. Some of the more important things to include in making a diagnosis are:

First, a history chart upon which should be listed hereditary traits and characters, environmental conditions, sources of nutrition in infancy, childhood diet, tuberculous or specific diathesis, diseases, stage of development and growth of the body and of the jaws and teeth, general physical condition, functional disturbances, condition of the nasal passages and nasopharyngeal space, individual peculiarities and malformations, physical condition of the teeth and contiguous tissues, types, nationality, sex, age, habits, and occlusal classification.

Second, a good set of models obtained from accurate impressions.

Third, a complete radiographic survey.

Fourth, good clear photographs. This should include at least a profile and front view.

Fifth, a chart to determine the relationship of the dental arches, one to the other, their approximate size and shape, and the distance the teeth should be moved.

Sixth, measurements to determine as nearly as possible the relationship of the jaws to the other bones of the face and to the cranium.

Seventh, a careful examination of the jaws and dental arches to determine, if possible, whether the perversion is the result of one or a combination of both, and whether there is a constricted apical base in either the maxilla or the mandible, or in both.

All these things should be correlated and a careful and thorough study made before deductions are arrived at or conclusions recorded.

PREVENTION

A careful analysis of the study of those cases of malocclusion which have fully developed reveals these distressing facts: that a considerable number could have been prevented; that many could have been checked in their incipiency; and that the balance could have been lessened in severity by instituting treatment at the proper time. These things may be accomplished by giving proper attention to environmental conditions and to development and growth, by regulation of the diet, by the recognition and correction of functional disturbances, by the elimination of vicious habits, by close observation to the deciduous and permanent dentition, and particularly during the time of the transitional period of these dentures (frequent radiographic examinations are invaluable during this period), by the application of minor corrective measures in correcting simple occlusal interferences and misplacements, and by beginning treatment at the time indicated. One of the most effective methods in the prevention of malocclusion is the judicious extraction of the deciduous teeth and especially the removal of these teeth when the roots are absorbing unevenly and forcing their successors into malpositions. Contrariwise, the injudicious extraction of these teeth and of the first permanent molars is a frequent cause of malocclusion.

The field of prevention is one in which the general practitioner can render a most valuable service. The early contact with children affords the opportunity to observe and correct conditions which tend to produce malocclusions. For example, in cases of minor occlusal displacements, such as linguoversion of central and lateral incisors, simple corrective measures may be applied which will prevent the development of a serious case of malocclusion. Since it is possible to serve only a small part of those in need of orthodontic service by the use of corrective measures, the value and necessity of preventing malocclusion are readily evident. Too little thought and attention have been given to the subject; its value seems never to have been fully appreciated.

EXTRACTION OF TEETH

The subject of the extraction of teeth in orthodontic therapy is of vital importance, for errors in practice often result in irreparable damage. Years ago the first step in correcting malocclusion was to extract one or more teeth. After Angle emphasized the value of occlusion and published his occlusal classification, the practice became less prevalent, but unfortunately some dentists still persist in the unwise practice of injudicious extraction.

Unfortunately, in a few sections of the country, the unsound and long discarded practice of extracting the four first permanent molars about the time of their eruption to make room for the succeeding permanent teeth has been revived. It seems strange in the light of present orthodontic knowledge that such a thing should occur; for, if any teeth can be said to be more valuable than the others, they are the four first permanent molars. The reasons are obvious. They are the first of the permanent teeth to develop and erupt and are the largest and

most firmly attached. They determine to a marked degree the depth of the overbite and control to a great extent the mesiodistal relationship. They are the most constant in taking a correct position in the arch and because of their size, design and location, are the most valuable teeth in mastication. Further, they serve as stabilizers during the transitional period of the dentures and are of the utmost importance when orthodontic therapy is indicated. In over thirty years of practice I have never seen a case in which, in my judgment, the extraction of the four first permanent molars was indicated for the prevention or treatment of malocclusions; exception, of course, is made where certain pathologic conditions exist.

There are some cases of malocclusion in which the extraction of teeth may be advisable, as in instances of mutilation, or where the cheek teeth have migrated forward and are usurping the space of other teeth, and occasionally in Class II and Class III (Angle Classification). There is, however, no hard and fast rule which can be applied to these cases or to any other cases. The advisability of extraction depends upon such a variety of extenuating conditions that no rule can be formulated. Each case must be decided upon its own merits, and in any event an extraction should never be made until after a thorough and painstaking diagnosis in which all possible factors have been duly considered.

TREATMENT

The inexperienced orthodontist and the average dentist are prone to place too much faith in the potential possibilities of an orthodontic appliance. Appliances may be divided into two groups—fixed and movable. Certain types in each of these groups have greater efficiency and broader application, but every appliance has its limitations regardless of the skill of the operator. The ability to recognize these limitations is the chief characteristic of a good orthodontist.

In the fixed type of appliance the anchorage is substantially attached to the teeth, so that the base part can be adjusted or removed only by the operator. The removable type is so constructed that it can be adjusted or removed by either the patient or the operator. The fixed type lends itself to the addition of a large number of components, the removable type to a comparatively few. There are indications for the use of both types—each has certain potentialities and limitations. The practitioner should use the type of appliance with which he finds from experience he can produce the best results but should not confine himself to one type. I find that the most common type—the fixed appliance—has many distinct advantages, but I have used both types successfully.

The age, accessibility, cooperation, nervous reaction, and personal habits of the patient, as well as the extent of the changes necessary for correction, are factors which must be considered in addition to those already suggested, before the type of appliance is selected.

"Appliances to be useful and efficient must possess certain basic characteristics. They should be made of a material which can be bent and shaped without injury and which will permit soldering without change of temper; strong enough to withstand the natural force of mastication and impervious to the effects of the action of mouth secretions. They must be constructed to provide adequate anchorage so that they will not be distorted or changed in position with the

application of force. They should be delicate though strong, simple though efficient, should provide the minimum interference with function, and should permit reasonable prophylactic care by the patients. An appliance should consist of as few parts as may be necessary to meet the requirements of the case and so constructed that components can be added or taken away without destroying the original design. They should provide for individual tooth movement and control and should exert only force enough to cause the teeth to move. They should be capable of moving a tooth in any desired direction and should be under control only of the operator. Appliances should be changed as often as indicated and simplified when possible as treatment progresses. It is poor practice to continue to treat a case with an appliance which may have been required in the beginning, which has performed its function and which could be replaced by a more simple and more efficient design. In the treatment of all cases, appliances should be eliminated as rapidly as possible.''

There has been criticism of the use of accessory bands and brackets. Although other ways have been devised as a substitute, my own experience has been that the most efficient and most certain means of gaining individual tooth control is by the use of bands and brackets when indicated. It is useless in many cases to attempt to rotate teeth without using bands as the medium of attachment between the teeth and the base arch. Bands must be used to stabilize both labial and lingual arches, as a well-designed appliance may be rendered useless or of little value if improperly anchored. It is evident that in using any appliance, that part from which force is to be applied must be fixed so that it will not be displaced or distorted. Perhaps the chief reason why the anchorage becomes loose, especially in connection with a lingual arch, is that the base wire is overloaded with too many finger springs and too much pressure is applied. Lest irreparable damage be done, it is essential that only enough force be applied to give the teeth a controllable movement in the desired direction. The work of Oppenheim, Gottlieb, Orban, Kronfeld, Marshall, Johnson, Hellman, Appleton, and others has demonstrated the histophysiologic effect of pressure upon the tissues during and subsequent to tooth movement. Their writings contain a warning against the dire consequences which may result from an indiscriminate application of force. They have given us a scientific explanation of bone resorption and repair under pressure applied by orthodontic appliances and have determined for us the amount of force which can be safely applied. Every one interested in orthodontic therapy should study the results of the investigations of these men.

It is probably true that the use of orthodontic appliances is abused more than that of any of the instruments in dental practice. I use *abuse* in the defined sense, ''to put to a wrong or bad use; misapply; misuse; pervert.'' This abuse may occur in various ways. The well-trained orthodontist may be guilty because of carelessness in construction or operation. The pseudo-orthodontist may be culpable because of lack of training and understanding, and the dentist may be guilty by being inveigled into attempting to render a service for which he is not qualified. There is daily becoming less and less excuse for either an orthodontist or a dentist to place an inefficient, archaic, or poorly constructed appliance in the mouth. The materials for appliances have been refined, and the

technic of construction has been improved and simplified. There are many modern satisfactory designs of appliances to use in orthodontic procedures. I wish to make it clear, however, that generally speaking, I mean designs which the practitioner can construct himself upon his own models and I do not mean ready-made appliances purveyed by supply houses and commercial laboratories.

For many years the dental supply houses have put out deceptive advertising, creating the impression that the only thing necessary in the treatment of malocclusion is the application of a mechanical device. The supply houses, however, have been even more respectable in this regard than the commercial laboratories. There is no denying the fact that some of the supply houses have contributed materially to the development of appliances. It has been largely through their experimentation with materials that these have been brought to the present state of perfection, and it has been mostly through their efforts that the various parts of appliances have been refined and standardized. They have been willing to take the chance in financing this work which has been a great benefit to the orthodontist. For all of this the profession should be grateful and should recognize the obligation. On the other hand, the persistent efforts to promote the use of appliances in the hands of the unskilled is a despicable and unsafe practice that must be condemned.

The commercial houses were quick to recognize the fact that there are numberless cases of malocclusion that can never reach the office of the specialist for treatment and have taken advantage of this situation to vend their wares by urging the general practitioner to undertake treatment on a basis which they chose to establish.

It is not my desire or intention to criticize anything except that which I believe applies to the abuse of orthodontic appliances. It is difficult to become reconciled to a situation in which a supply house advertises an appliance for general use by the profession which requires the most skillful and experienced orthodontist to assemble, adjust and operate. This appliance has many virtues and when used properly in cases where it is indicated is capable of producing splendid results, but in the hands of a novice it is a dangerous weapon.

For the manufacturers to set forth the claim that an appliance can be used almost with impunity by any one and at the same time disregard all other factors concerned in treatment, is a great wrong to the patient and to the dentist or orthodontist.

As bad as this practice by the supply houses may seem, it does not approach the flagrant and damaging advertising propaganda put out by some of the commercial laboratories. When a laboratory requests the dentist to send in a set of models from which a diagnosis will be made, treatment prescribed, and appliances constructed, and further, informs him that the case will be supervised and the appliances changed from time to time as treatment progresses, the proposition has just about reached the limit. This kind of practice is an insult to the intelligence of an honest person and is obviously nothing but a commercial project.

I must confess that I know of no way by which a dentist can get into such serious difficulty as by following the advice of these laboratories; a method which

discounts immediately the fundamental principles of orthodontic practice, both biologic and mechanical, and totally disregards all the results of investigation and experience.

The object of orthodontic care and treatment may be summarized as follows:

1. The prevention of malocclusions and malformation in whole or in part.

2. The restoration of functional balance and activities.

3. The conservation and promotion of the health of the immediate structures concerned and, so far as possible, of the whole organism.

4. The synchronization of the factors of development and growth by remedying and removing interfering forces.

5. The correction of occlusal displacements and interferences and the adjustment of malrelation of the jaws and dental arches.

6. The improvement in the appearance of the individual by eliminating facial and structural deformities and harmonizing and correlating all related parts.

7. To teach the importance of an efficient masticating apparatus, to give instructions in the proper hygienic care of the mouth and teeth, and to impress upon the patient the necessity for favorable environmental conditions.

CONCLUSION

That competent training has been impossible for a great number of practitioners is readily recognized. The courses given in most dental schools are limited in their scope, and only the bare fundamentals are covered. There are only a few graduate courses available, and those of university connection and grade require one to two years in attendance. The treatment in most cases extends over periods from one to three years, and practical clinical experience is burdensome and difficult to obtain. And finally, since there is no standardization of tooth movement and each case is a separate entity, the task of preparation is slow and tedious. Knowledge in orthodontic practice has unfortunately been confined to the small group of specialists in the field, and this condition adds to the paucity of qualified practitioners. Orthodontic meetings have been attended only by orthodontists. Dental publications carry but occasional articles on the subject and orthodontic publications have a limited circulation. Papers, clinics, and presentations on orthodontia at dental meetings are restricted and uncoordinated. As a result of these conditions the members of the profession have had little opportunity to acquaint themselves with orthodontic problems. This state of affairs also precludes the possibility of acquiring sufficient information or knowledge to carry on orthodontic procedures by reading dental journals, by hearing papers, and by seeing clinics at dental meetings.

The specialists realize that the solution of the pressing economic problem of demand or rather need for orthodontic service can be solved only by the general practitioner. The orthodontists are willing and eager to cooperate with the dentist in assisting him to become proficient in this work, but the technic and the management are so exacting that a careful study of the factors already men-

tioned, supplemented by practical experience, is necessary before one is capable of accomplishing satisfactory results and before the danger of doing serious damage to the patient is eliminated.

Orthodontic work being carried on for profit alone by an untrained dentist, attempting to treat a case by reading the pamphlets which come with an appliance bought from a laboratory, or attempting to work under the supervision of laboratory men, grossly ignorant of the many problems concerned in orthodontic treatment, is dangerous. The dismal failures which result from these methods are tragic. They impose an obligation on the dentist which he cannot discharge; they react against his reputation and bring into disrepute the practice of orthodontia. The assumption that satisfactory service can be rendered by merely placing a laboratory appliance in the mouth is fallacious. The responsibility, obligation, danger, and anxiety are too great; and the expected compensation, in terms of money, appreciation or satisfaction, is too speculative.

The solution of the problem of rendering orthodontic aid, in view of the specialized knowledge required and the present deterrents in the acquisition of such knowledge, lies not in the application of corrective measures but in the field of prevention. In this field every practitioner can participate. I believe that at present the responsibility of the average practitioner lies more specifically in the field of prevention, in correction of minor occlusal disparities only, and in the recognition of malocclusions which he cannot treat competently and in truth may not be amenable to treatment by any one.

In summary I may say that a general practitioner should not undertake orthodontic procedure without being familiar with the knowledge in this field and without being capable of doing the work on his own resources. Every patient has a right to assume that a practitioner holding himself out as an orthodontist has the ability to consider all the factors suggested in making a diagnosis and in beginning treatment. In the hands of a qualified practitioner much of esthetic and salutary value may be accomplished, but in the hands of an unskilled or incompetently trained dentist an orthodontic appliance becomes a dangerous instrument.

THE LIMITATIONS OF ORTHODONTIA

JEROME H. TRIER,* D.D.S., NEW YORK, N. Y.

CONCEIT in ourselves and fear of what we may see have led many of us to continue the practice of our specialty in the blind. An economic necessity propels us onward in the thought that we are remaking teeth and jaws for the benefit of our patients. I am not so sure, however, that we are the benefactors of mankind, as we should like to believe.

An article by De Vries in the February, 1933, issue of the INTERNATIONAL JOURNAL OF ORTHODONTIA is pertinent: "There are many of us today engaged in the practice of orthodontia who are challenging our own position as therapists. To put it more clearly, we are beginning to doubt our own ability at times. To be fair we can also truthfully say that we frequently marvel and wonder at the successful outcome of many of our attempts. I have the most profound respect for some of the members of our great profession, and yet I know that they all must have these moments of sober reflection when the gold of their accomplishments becomes a bit tarnished in view of failures. Last year I had a conversation with one such, whom you all know and respect, who has given much to orthodontia and whose example of fine professionalism is outstanding. In discussing our own personal reactions to our work, he said in essence, 'You know, I have come home some days and remarked that if I knew of some business or activity which would provide me with a similar income I should like to get out of orthodontia. Then, maybe a week later, I would find myself just bubbling over with enthusiasm over the way some of my cases were progressing and feeling that orthodontia was the finest work in the world.'" I was glad to hear him express himself so, for I had often felt the same way. It is perfectly plain that every man who works in the physical field is likely to have his temporary discouragements, but I know of some who apparently never have such misfortunes—at any rate, it is difficult to get them to admit them.

You may ask what makes me expound in this manner and what bearing it has on the limitations of orthodontia. The first question may be answered in two ways—first, by recalling some of our patients whom we believe we have done so much for, and, second, by keeping under observation cases in which we have any doubt, and observing nature's way of revamping the teeth to assume their correct positions in the arch. We should assume a conservatism that is born of clinical observations.

Before I can intelligently discuss this subject, which might easily be vague because of its phrasing, let me define the term limitations as given in the Funk and Wagnall's Dictionary: "The condition of being limited (restricted within a prescribed area)."

*Chief of Orthodontia Department of Sydenham Hospital and Midtown Hospital.

For further clarification, I shall subdivide the various factors which may be instrumental in limiting our professional efficiency.

I. Those which deal with the operator's ability.

A. Whether or not he is temperamentally suited to practice the specialty of orthodontia.

A cross-section of the men engaged in the exclusive practice of orthodontia might present the following descriptive picture. The men are of medium height, pleasant in their relationship with others, not very domineering and egotistical. The comment might be made that such a description might fit any group of professional men. Contrast the foregoing picture, however, with a gathering of surgeons. By the nature of our work, we are, as a group, very similar to the pediatrician. Any man entering the field of orthodontia must possess the aforementioned characteristics to instill in the young patient that feeling of fineness, gentleness, and good cheer, else the first step in the chain of a successful practice will be handicapped, limited, or restricted in proportion to the individual's ability to develop such qualities.

Another important psychologic factor which must be a part of the man choosing orthodontia as a specialty is that quality of being able to stand by and observe progress being made slowly. There are some men so constituted that they must see things happen under their very hands. The very nature of our work would react as a distinct limitation to the success of such an individual.

B. Improper groundwork is a direct factor which tends to make the limitation of our specialty variable in the hands of each operator. Under this, we may include such factors as the student's ability to absorb knowledge presented, the standard of the course given by the particular school, the amount and variation of clinical material with which the student has been brought in contact, his mechanical ability, and, after some years, the acuteness of the operator's orthodontic sense. By the latter, I mean to infer that there are some men who have the power to analyze a situation more rapidly and more keenly than others. This same sense of observation and deduction is evidenced, to a varying degree, in all individuals, regardless of profession.

C. Wise indeed is the man who knows his own limitations. This realization, unfortunately, is a part of too few of us. Upon the presentation of a patient, we are so eager to try our charms that we are likely, in our overenthusiasm, to tackle all cases without consideration of our capabilities. This super ego blinds us to our own frailties. I shall never forget Waldron's advice to me after I had served some time in the clinic of the school: "The sooner you will learn to practice selective orthodontia, the quicker you will establish a reputation for yourself as a capable practitioner in the specialty."

II. Appliances.

A. The character of the wire used, its metallurgical make-up.

The quality of wires today requires very little of our attention. The dental dealers help us by conducting their own research in the field of our needs and producing a product of merit. It is essential only for each man to

learn the characteristics of the metal of his choice, so that he may get the most out of each appliance constructed from it.

B. Designing of the appliance.

1. Removable, and
2. Fixed appliances.

In the removable appliance, there is no doubt that the operator starts with a distinct limitation.

When we approach the subject of fixed appliances, we immediately enter into the bringing up, if you will allow me to use that phrase, of each individual operator, and we could debate the merits of various appliances. It has become strongly impressed upon me, that after a man has learned to manipulate an appliance efficiently and his results are satisfactory, he should deliberate well before revamping his methods; for, in that period of readjustment, his limitations of efficient service to the patient will be in direct proportion to his ability to develop a dexterity which he was able to exercise with the old appliances. Hellman, I believe, made this very fine analogy when he said, "After an artist has learned the feel of a brush, he hesitates to change that brush for another"; and so with us. When we have learned to mold the mouth efficiently with a particular appliance or appliances, we should continue the use of these until we are convinced by clinical results that other types of appliances are serving patients more efficiently.

There are a few points I should like to make relative to appliance design, which have a direct bearing upon our limitation.

1. In designing an appliance, we must have given the case a thorough diagnosis, and we must have already definitely planned the treatment of the case. Once having established the various movements required, we must be able to understand the various actions and reactions of our designed mechanism. The success or failure of an appliance will make for a limitation or a perfection of results, everything else being equal.

2. Each appliance should be as simple as possible, with the least amount of harness applied to the mouth. Much of our trouble and limitation can, I believe, be directly attributed to complicated appliances, over which control becomes a questionable factor.

C. Construction of appliance.

In what way can the construction of an appliance limit its efficiency and so react upon the success or failure of our case? In the construction of our appliances, we must endeavor to make all surfaces as smooth as possible so that the patient will have very little reason to tamper with the mechanism. All the laws of good mechanical technic should be followed with every care.

A review of orthodontic literature will convince us that orthodontic appliances tended to limit results prior to the last twenty to twenty-five years. In fact, the accomplishments in the results we occasionally see make us sit up and wonder whether or not those pioneers were not made of better stuff than we are.

III. Radiographic studies and diagnostic aids.

How do these two factors directly affect orthodontic limitations? The percentage of successful cases can be materially increased if we avail ourselves of any diagnostic aids which present themselves. This is particularly true of the young man who is about to enter the specialty of orthodontia. Let us assume that we cannot deal with the mouth entirely by any mathematical formula, that we are dealing with a biologic problem. Granted that this be true, if by past clinical experience a system or systems of diagnosis has in any way made our problem simpler and reduced the element of guessing, then we should avail ourselves of that aid. Any device which will in any way enable us to render a finer service to our patients must not be set aside because the originator is a so-called competitor. We are not selling a commodity—we are rendering a health service to the public.

Improper or, as we find in some offices, no radiographic examination will have a direct bearing upon the outcome of the case. In any number of cases patients have advised us that cavities developed due to the bands on the teeth. Until a few years ago we did not have the advantage of bite-wing films, which, if employed before a case is started, will detect cavities which should be cared for before any bands are cemented. The use of this type of film at this time will avoid many embarrassing situations later. It is the routine procedure in our office to employ the fourteen-picture examination—six bite-wing radiographs, and lateral plates. Another point of great importance is the periodic radiographic study during treatment. Such radiographic studies from time to time will prove a valuable part of our records and, in many cases, will present conditions which might interfere with the successful termination of our case.

The following are limitations of orthodontic treatment which are due to to the patient's frailties:

1. Physical condition of the patient, such diseases as will directly or indirectly affect the metabolism of the tissues involved in the orthodontic treatment: anemia, tuberculosis, glandular involvements, neurotic conditions.

If we are not to be hindered in establishing a healthy oral condition, we must start work on subjects who are physically healthy. Inasmuch as we often see many children before the parents realize the value of a thorough physical examination periodically, in spite of no apparent disturbance, we are in a position to impress the parent with the importance of the Chinese idea of medicine, that is, of paying your doctor while you are healthy; and, at the same time, we can assure ourselves that we may expect healthy reactions to our orthodontic measures.

It has long been my contention that the insertion of an appliance into the mouth of a child who is suffering from any physical handicap just adds one more disturbing element to the recuperative powers of that patient.

2. Habits of patients which make for limitations.

In addition to all these limitations, there is another factor which interferes with the successful termination of our cases: the habits which patients have acquired that directly cause an oral deformity, such as thumb-sucking and lip habits.

For many years it was the belief that thumb-sucking was a primary cause of many of the Class II, Division 2 cases. There seems to be a change in opinion about the etiology of these cases, but that is not our problem at this time. We are here concerned with the limitation wrought by such a habit. Thumb-sucking is the direct cause of about 2 per cent of the cases seen in any orthodontic practice. The approach in the treatment of such cases must be a psychologic as well as an oral correction, for treating such a deformity without stressing to the patient the necessity for breaking the habit can result only in failure to maintain the corrected condition.

Any lip habit producing an oral deformity demands the same type of treatment for correction.

3. Disproportion of tooth material of the mandible and the maxilla.

A condition with which we are occasionally confronted is a variance in the size of the teeth of the mandible and maxilla. This limitation is a serious one, because we are unable to detect such inequalities by the eye method of diagnosis. We have been taught that teeth of the right and left side of the same family are the same size, but if we were to survey the anatomy of each such tooth and make comparisons, we should be greatly surprised by the variations noted.

4. Cooperation of the patient in following instructions.

This is an unknown quantity, if I may be permitted to use that term, and the limitations of our service to the patient are in direct proportion to the degree of cooperation received. It is true that our manner of approaching the patient in asking for that cooperation influences greatly his response. It is advisable, after having instructed the patient in the use of elastics or having given him muscle exercises, to inform the parent by letter that the successful outcome of Junior's case depends to a great extent upon the carrying out of the instructions or exercises given.

5. Age of the patient.

This is another factor which played a great part in the questionable outcome of cases years ago, but today presents a more favorable outlook. I believe that we have reached the stage in orthodontic treatment, by the perfection of mechanical appliances, that we may safely treat the average malformation in patients well on in the thirties, provided that we choose our cases and stress the point that all such treatment, as any other medical treatment, depends upon the patient's ability to cooperate and respond to our drugs, as it were.

IV. Office equipment and efficiency.

I have visited many offices which were poorly equipped, and by that I do not mean that there was a lack of beautiful dental furniture, but I do mean a lack of common tools necessary to carry on treatment properly. We should learn to get the most out of any instrument we use, and to use that one instrument in the mouth until we have accomplished everything we can do with it. This will make for greater efficiency of operation and a feeling of confidence on the part of the patient.

Office efficiency is very important. The proficiency of the nurse will indirectly or, we may even say, directly affect the well-being of the operator, and so react upon the services rendered. The nurse or secretary should be able to carry the burden of the entire office, and the doctor should give his assistant free reign. Records of work and various correspondence should be so filed that we can refer to them instantly. Many other important points under the question of office efficiency could be enumerated, but I should like to stress one at this time—the absolute necessity for coming to a thorough understanding with the patient before any services are rendered. Any verbal agreements should be verified by letter to avoid any misunderstanding.

At the beginning of this article, I made the statement that many cases brought to us for an opinion would be better left to nature's orthodontic appliances for correction of the apparent, and I say "apparent" malformation. It is possible that in the transition of the jaws from the deciduous to the mixed and to the permanent dentition, the teeth may assume what we may consider malformations at the time the child is brought to us. If we are patient enough to keep these cases under observation, we shall be rendering the patient a great service. There are times when exercises would aid nature in correcting the condition, and times when the removal of teeth would prevent prolonged orthodontic treatment at some future time.

I have attempted to show some of the factors which limit the orthodontist in rendering the most efficient service to the public. These factors are so variable that it is impossible to draw any practical conclusions, but each man must take the time to make a thorough examination of his own abilities and shortcomings for his personal records.

THE TIME FACTOR IN ORTHODONTICS, PARTICULARLY IN REGARD TO EXTRACTION*

G. F. Cale-Matthews, L.D.S., London, England

I QUITE realize that I am touching a side of orthodontic study which is not usually discussed in a scientific society; nevertheless, as a part of practice, what I have to suggest has a very distinct and marked influence on the ultimate result of one's treatment.

Assumptions of treatment calculations in the matter of time rarely, if ever, work out in a definite or exact manner, and it may be a very serious menace to the mutual welfare of both patient and operator (leaving the parent, for the time being, out of the question, although so very important and necessary) if one has underestimated the time factor. Dissatisfaction must be the inevitable result of a miscalculation, with a consequent loss of prestige. This statement applies particularly to what is supposed to be a simple case, although I would suggest that a simple case is rare even if it ever exists, regarding it from the ideal standpoint. One's whole knowledge and experience must be enlisted at the initial stage to be able to give an approximate idea of this time factor. There is no knowledge at this initial stage of the temperament of parent, possibly most important, and child; no indication of trouble which may arise from unknown health conditions, both present and to come, and it is evident that any preliminary interview must have a forcible and marked effect on the attitude of those responsible for the upbringing and welfare of the patient. The foregoing remarks you may accept, if you like, as my apology for introducing the subject. I have endeavored to avoid and evade openly the question of the economic side, but at the same time it will be ever present in our minds if I have presented my thesis as I hope to do.

My fears are that unless the public can feel a very definite assurance that orthodontic practice is a necessity, we shall make little progress except among those who regard dentistry as a serious and obvious attention, and can easily afford the treatment.

As a preliminary, may I quote from John Hunter the following words: "Don't ask me what I have written or what I have said, but ask me what I think now and I will tell you." These words imply a right to change an opinion upon fresh evidence or new facts being brought forward. It has been said that the man who never changes his opinion never accomplishes anything. I am not sure of the accuracy of that quotation, but at any rate it embodies the ideas that I wish to give here. So far as I remember, we have had few, if any, papers which have dealt with the economic side of our work, and I know that it is distasteful and impossible to discuss these matters in a large assembly; but so

*Transactions of British Society for the Study of Orthodontics, 1934.

often one is asked questions of an economic type, both by patients and by colleagues, and unless I am very stupid or so much out of things, I find there is an exaggerated idea in the minds of some of our professional brethren and our would-be patients, that orthodontic treatment is very largely a luxury, sometimes unnecessary, and that results can and should be obtained in a very much more simple fashion than we are in the habit of utilizing.

It is somewhat distasteful to me that the preliminary introduction to a consultation may be broached in an effusive and complimentary manner, and the inference implied that oneself is one of the very few who is capable of rendering the necessary service of correction. This always gives me an unconscious warning of troubles to come. I infinitely prefer to build up my parents' and patients' gratitude gradually, than to have it volubly and emphatically thrust upon me before we have any mutual acquaintance.

The difficulties in orthodontic practice do not lie only in the purely technical work, but also in the associated business and economic side of our work—involved as it is by our scholastic system, difficulties of referring patients at long distances for adjustments of appliances in cases where it is impossible for them to attend regularly, and very frequently a lack of appreciation after a time on the part of the parents in following up the necessary treatment finally to complete a case, and render it as perfect as possible. Initial progress may be very spectacular; and, this once attained, the parents assume, or may assume, that the work is ended. These are the cases that give us so much worry and anxiety, and so commonly are called "reversions"; they are never thoroughly completed. We know that the practice of orthodontics is anathema to a great number of general practitioners, and yet they are expected to undertake treatment under the persistent request of the parents, on the age-long assumption that either in medicine or in dentistry the practitioner is both capable and willing to undertake any treatments, however difficult and involved they may be. We know that this is not a practical solution of the problems, and the general practitioner, with so many variations of dental work in his daily practice, is unable to devote the necessary time at short notice to correct or adjust the appliance of a patient who may be sent to him in a casual manner. Nevertheless, one is grateful for the help that these men afford under the circumstances, and we should have some difficulty in carrying on our work without their help. It is obvious that the general practitioner must undertake orthodontic treatment. It is essential to the maintenance of his practice, and he may be well advised to eliminate the economic side and regard that factor as a nonearning or unprofitable side of practice.

What new bombshells are we to expect? Involved as opinions are today, are we to be further encouraged or disheartened by any new facts or theses which Oppenheim is to give us in his new book?

I might have entitled this paper, "Some of Our Difficulties in Practice," but I do not wish to touch on the technical side, but rather to elicit from those of long experience some of their methods in dealing with the outside complications which arise. Over and above the conditions I have already cited, I think it is wise to give considerable attention to the psychologic side of our work. This attitude can be gained only from our experience, and I am always rather doubt-

ful and a little bit pessimistic of the ultimate results when I have given a diagnosis and opinion to the voluble and effusive mother—who so often knows beforehand what is necessary to be done. I find her enthusiasm very largely reduced as time goes on, and people of this temperament are often extremely impatient and expect wonders to be accomplished in a short time. The child frequently follows on with the same temperamental difficulties.

Again, I have always great hesitation in definitely allowing the time factor to operate in my mind with regard to the unusual but still fairly frequent type of child with a peculiar cold, light eye, of what I call starling blue or green type, which never is enthusiastic or shows interest in the work one is doing. These are purely personal thoughts and experiences, but as one grows older, one is unconsciously, perhaps, inclined to make mental reservations in regard to these particular types of cases. There is, again, the impossible, turbulent, destructive child, and the careless and thoughtless child—very often the progeny of the same type of parents—careless with their appliances, either breaking or losing them, with an utter disregard of prophylaxis and lack of general attention. This does not apply to any particular class, but may be as prevalent in the upper classes as it is in one's hospital practice. The problem of the boy who must play rugger, box and "rag" is an ever present one.

One of the problems that causes me more anxiety than any other is that, having given an opinion and having made a definite time contract, either verbally or in writing, it may be a more or less one-sided document or agreement. Whatever progress may be made, one is always diffident and anxious to avoid cessation of treatment from any of the foregoing causes. Having once embarked on the treatment of a case, it is obviously, to me, an impossible position ever to consider ceasing one's treatment before completion. The result of any cessation can only recoil on the operator, and one is always very diffident of the accuracy of a statement that the child has been under treatment for so long with Mr. X, and either the result of his treatment is stationary, or the condition is even worse than when he started. It is always wise, I feel, to have a mental reservation in regard to those statements, as one so frequently finds, after a time, that one is being treated in the same casual manner that Mr. X had been treated. Therefore my own difficulties from this point of view are absolutely as great after many years of practice as they were when I first started enthusiastically to undertake it. There seems no way out, and while in ordinary business relations an agreement is steadfastly and rigorously upheld, in professional life it seems to me that an agreement of this description mainly affects the operator. Perhaps some will be generous enough to outline their methods of dealing with these cases, which I imagine must be pretty general in every one's practice.

I like to feel that I can eliminate any association of a business character with my work, once I have agreed upon the basis of that side of it, and then to build up a state of friendly and often affectionate cooperation with the child, thus gradually enlisting its help and creating an enthusiasm which ultimately results in a real gratitude and long friendship: and I can then regard the business side as a thing apart.

There is, to me, a danger in the wonderful evolution of the technical skill shown in the practical side of our work. The tendency seems to be to evolve beautiful pieces of mechanical work, complicated frequently in their ingenuity, which may or may not attain the desires in a practical way of the designer, or in his or her hands may be entirely efficient but, on the other hand, are quite impossible for the beginner to understand and use. I often feel that the simpler the method employed, the more valuable it must be to the great body of students. Therefore I come to the problem of "Time" in the practice of orthodontics, and

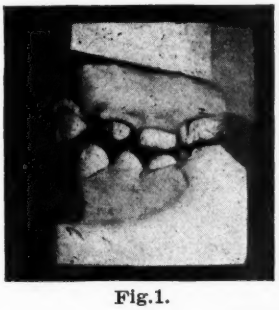


Fig.1.

Fig. 2.

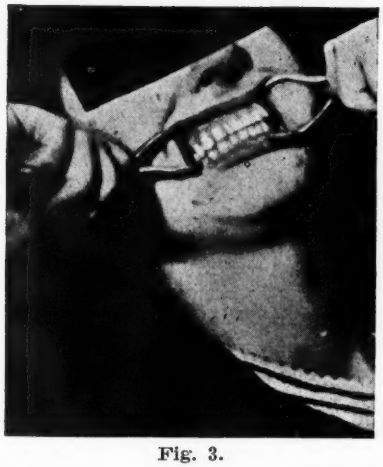


Fig. 3.

Figs. 1, 2, and 3.—Age eight years and four months. Bilateral, postnormal. Slow eruption of $\frac{3}{3}$. Completed and under retention. Estimated originally two years to restore normal occlusion. Actual treatment and preliminary retention five years. Any suggestion of extraction would have been seriously resented.

when I use the word "Time" I wish it to express more than the passage of months or years, and to contain within that word the other considerations that are so important and necessary in our practice. In the word "Time" I wish to include, mentally, the condition that will be generated in the mind of the parent, the difficulties that are to be overcome by the operator, and the economic factor that has to be seriously considered by parent and by operator;

thus "Time," in the sense in which I am using it now, means the amount of service and the cost to the operator and the parent, and so rather than have to talk about fees, length of time of treatment in months and years, I want to try and establish in your minds that the simple word "Time" includes all these.

May we for a moment imagine that we are in consultation with a very complicated case in a child of seven years. At once it is realized that there must be five or seven years' constant supervision before one can definitely say, "this case is completed." The loss of deciduous teeth and replacement by the permanent ones, the actual mechanical treatment to render the equation perfect, must carry one through to the time when the permanent teeth are all in position. If at the initial stage the parent is told that this is a condition which needs more or less constant observation and treatment for seven years, it is to the average individual an appalling suggestion. If, on the other hand, the patient should be nine or ten years of age, that question of time is reduced by a natural reduction in the time of completion of the dentures.

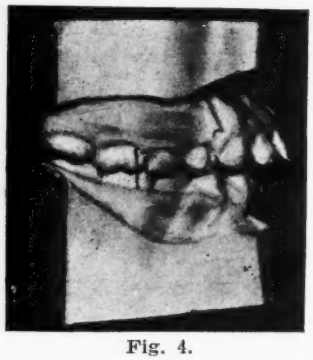


Fig. 4.

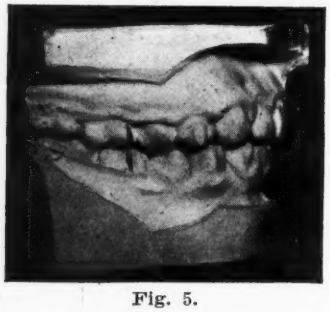


Fig. 5.

Figs. 4 and 5.—Patient thirteen years old. Good occlusion, maxillary incisors proclinated. I regard this as difficult type of case. Estimate two years. Actual time ten months, when retentions were placed. Error on the right side of time.

Now, how are we to overcome, and what methods can we employ, to satisfy the parents and ourselves as to the best explanation of the difficulties involved in the treatment of these cases? Personally, I do not know. Time tells me that the more experience gained, the more critical and the more exacting requirements may be, and it is difficult to bring oneself down to the mentality of the average parent and accept his suggestions—often so volubly given. From our point of view we have to decide what is to influence us, not so much in an individual case, but in the general attitude to the subject of the average parents. It is practically an impossibility to convey to the average parent all that is conveyed in the word "Growth," whether this be normal or abnormal. It seems to me that in England we have a conglomeration of the postnormal, or distal, occlusions. We have not educated our people in dental anomalies. In America, it is possible that they have better material on which to work, a very thorough and sincere dental education of the public, and that our dominant postnormal condition does not exist to anything like the same extent. It is obvious that

treatment of a great mass of malocclusions in our population, with the idea of developing a perfect occlusion, is out of the question. The time factor alone renders this impossible.

How can we approach this subject both from parents' point of view, the child's benefit, and our own difficulties? The dental schools are able to give only a little help. In the teaching of the students a certain number of cases are demanded for treatment in their curriculum. This in a thickly populated neighborhood only touches the fringe of the problem; therefore the young practitioner has had very little opportunity of studying the subject seriously, and

Fig. 6.

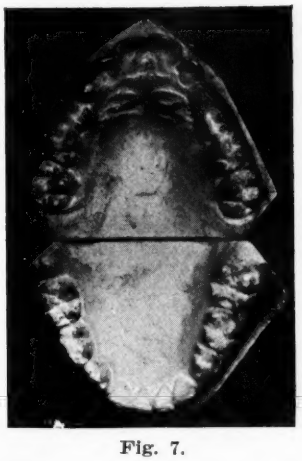


Fig. 7.

Fig. 8.

Figs. 6, 7, and 8.—Patient nine years and eight months old. Good occlusion; no space for $\overline{3}|3$. Estimate two years. Actually eighteen months. Difficult to handle and no enthusiasm.

upon qualification is very ill equipped to deal with the problems that will present themselves. What is the remedy? So far I can see nothing more than an occasional desire to acquire the necessary skill which only time can give, and during this probationary period, serious mistakes may be made which may materially affect the future career of the student, and his enthusiasm may be dulled.

The ever present economic factor which has been so dominant during the past few years must be recognized as a serious menace to our work, and I have

observed during this time that there have been many cases in which I have been consulted in which anxiety of both parent and dentist to undertake treatment has been present, and the outcome of consultations has been more or less negative. I could quote you many cases to illustrate this particular point, but I think one interesting case will make my point clear. It shows how varied can be the attitude of parents and practitioners. A girl of fourteen years with a very pronounced postnormal occlusion was brought to me for an opinion as to treatment. In this case we had an anxious mother, an unobservant father, and two opinions which were diametrically opposed. In the one case, treatment was advised which did not include extraction; in the other, treatment was advised

Fig. 9.

Fig. 10.

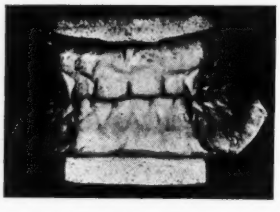


Fig. 11.

Figs. 9, 10, and 11.—Patient aged eight years and five months. Time estimate two years, with reserved opinion based on eruption of premolars. Treatment directed to establish correct occlusion without interference with incisors. Illness or operation greatly delayed treatment. Actual time four years. Two years on wrong side.

Fig. 12.

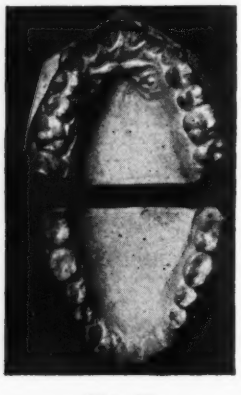


Fig. 13.

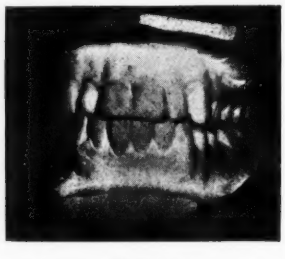


Fig. 14.

Figs. 12, 13, and 14.—Patient aged thirteen years. Normal occlusion. General narrowing in anterior part of both maxilla and mandible with marked crowding. Estimated time up to two years. Actual active treatment nine months. Fifteen months on the right side.

which included extraction. My own opinion was that the first advice was correct. Here the economic factor came in. Although in a very good social position, the parents were poor. The second treatment, involving extraction, was to be carried through at a fee which could not in any way show any recompense for the work necessary; and the first treatment, which did not involve extraction, was to be carried through at a lesser fee. This was purely a personal matter, but the result of my consultation was so definite that I advised the parents to accept the offer of the first treatment. It was so entirely impossible from my point of

view that any man who knew what was necessary could undertake this work with any prospect of success and financial satisfaction to himself, at the fee quoted, that I could only feel he had no knowledge of his subject and would regret ever having undertaken the case. Time will prove whether I am correct in my diagnosis of the general economic situation. This is only one illustration of many that one comes across.

It must be within the knowledge of many senior members of this Society that their help is requested after parents have spent much "Time" without any apparent results, and have become hopelessly disappointed at the possibility of any benefit ever accruing. This is, I feel, placing before you an entirely new attitude with regard to orthodontic treatment, but I feel it is an extremely important side to our work and can do far more harm to our specialty than any amount of good work, because it is so obvious that failure must always be far more advertised than success. Some two years ago, the parent of an American boy of fourteen years was introduced to me by a general practitioner for my

Fig. 15.

Fig. 16.

Figs. 15 and 16.—Patient aged twelve years. Premolar extraction. No treatment prescribed. This quickly resolved itself under treatment and no time estimate was given. Actual holiday visits covered one year and nine months.

opinion, and with the hope that I would be able to help her in introducing her to an orthodontist on the Continent who would be able to continue treatment for her child who was going to school on the Continent. In conversation, I discovered that this child had been under treatment since he was seven years of age at a fee which would stagger even the most exclusive orthodontic practitioner in this country. There was no evidence of dissatisfaction on the financial side, or in the treatment, and I could not see how any amount of further treatment could accomplish the ideals of my American colleague. The occlusion of the posterior teeth was perfect; there was no caries after all this treatment; the mouth was perfectly healthy, but the maxillary right canine was still completely outside the arch, and I could not see how it was to be placed into position. After a long consultation, my advice was to remove the first premolar and to allow the canine to be drawn into position. This, of course, entirely subject to the opinion of the man to whom I sent her. This opinion was given in response

to a definite request. I wonder how many English parents would still regard the matter with the complacency of this American parent, after seven years of active treatment.

There, I grant you, we are dealing with a somewhat unique case. In this country we have to deal with people who have not that wealth or possibility of rewarding us to anything like that extent. I think that behind the very constant advice that is given by the general practitioner, the great benefit of extraction to the child and the parent will accrue in this matter of time. To the orthodontist, the problem is without exception the most serious one he has to decide; so many factors have to be considered in this diagnosis. One has to acquire or develop a sense of the possibilities in regard to the child's physical development. On which side is it to develop, the paternal or maternal? Is it a throw-back? Can one gather any help from any of the family records? In many cases they are nonexistent; and it is this weary time of waiting for develop-

Fig. 17.

Fig. 18.

Figs. 17 and 18.—Patient aged ten years. No time estimate. Hopeful to get results on complete eruption of second molars. Actual treatment two years, seven months. Third molar interference is developing.

ment of a tardy eruption of individual teeth in a young child that so tires the parties concerned, and it is quite understandable that a busy man in general practice will find himself gradually disinterested in a case that shows no response to his treatment. These things are difficulties that exist for every one practicing dentistry, and they exist for the orthodontist just as much as the general practitioner; but when one is doing one job it is quite possible that what is insuperable to the general practitioner is of ordinary accomplishment in the hands of the skilled orthodontist.

In presenting some cases which have been completed, I am doing so with the idea of showing the "Time" involved and not the methods. I feel we shall be giving greater service in this country, at any rate, by a catholicity of method rather than by a reservation of technic. While your criticisms will probably be directed to a reduction of the time factor in some of the results I am showing you, I ask you to reserve that criticism of the existing conditions obtained and to

throw your minds forward to the possibilities that may arise after the completion of treatment. I feel that more serious consideration should be given to the question of extraction after completion of treatment than before or during that treatment. By this, I mean that if one is given the opportunity to correct a malocclusion, one must look to future possibilities of having the correction again upset. This comes about through what I feel is an ever increasing abnormality—the impaction of the third molars, and it is becoming my constant practice to take every care in observation that the third molar shall not be a possible factor in the derangement of any work I have accomplished. In regard to this, I have expressed an opinion in correspondence with some of my American friends that

Fig. 19.

Fig. 20.

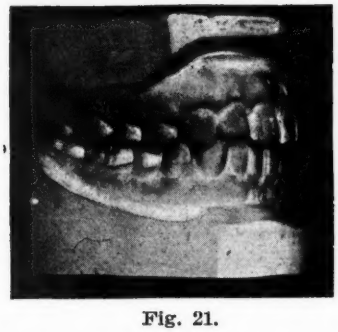


Fig. 21.

Figs. 19, 20, and 21.—Patient aged eight years, seven months. Bilateral, postnormal. Many difficulties arose in course of treatment. Delayed eruptions, and only holiday treatment possible. Actual time elapsing between first and final models five years and nine months. A time estimate would have been sadly upset.

the removal of the second molar may be a wise proceeding where the third molar shows any abnormality of position. I was rather interested by the suggestion of one eminent American practitioner, to which I have not yet replied, that the malposition of the third molar in the States did not afford them any anxiety, as they had many skilled exodontists to whom this factor presents no difficulties.

At this point, I have saved no time in the broad sense. My case is completed anteriorly, and my safeguards are only the prevention of future trouble.

During my student years it was customary to remove the four first permanent molars if there was evidence of caries or anterior crowding, and this treat-

ment was stopped only when Angle evolved his theory of the possibility of retaining the full complement of teeth. Following upon this treatment in those days one had little evidence of troubles of impacted molars. Radiography was in its infancy, and I think I should be correct in saying that it is well within the last twenty years that this third-molar problem has presented the difficulties with which we have to contend today, and it seems to me that we must look to some provision of space in the molar region to overcome these difficulties. This,

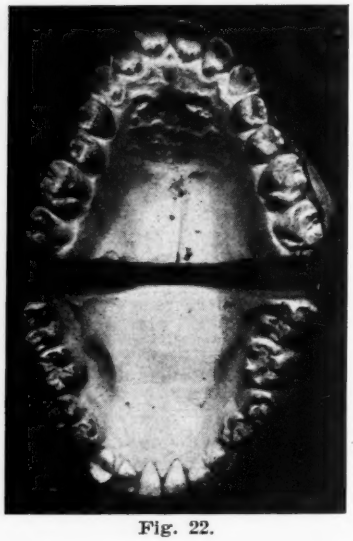


Fig. 22.

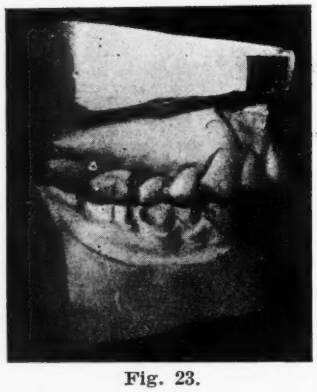


Fig. 23.

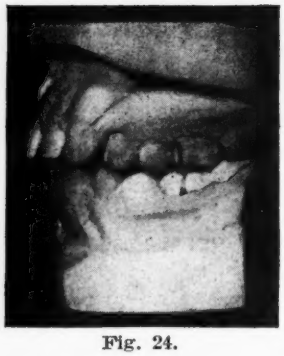


Fig. 24.

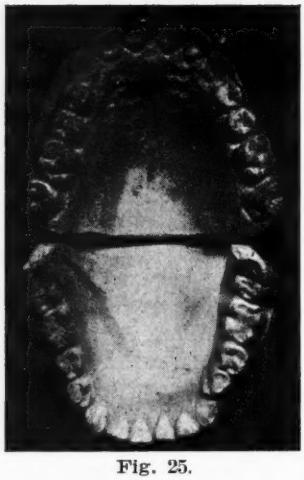


Fig. 25.

Figs. 22-25.—Patient aged fourteen years. Unilateral, postnormal. $\overline{5\,4}\,|\,\overline{4\,5}$ out of alignment. Open-bite. Occlusion established. $\overline{3\,2\,1}\,|\,1\,2\,3$ lengthened. Case under retention. Time estimate two years definite contract. Started October 31. Exceeded estimate, when retention was placed, by three months. Under constant observation.

therefore, is my thesis: it does not relieve us from all our troubles in correcting anterior malocclusions. Thus we are again thrust back to the "Time" factor. The removal of first maxillary premolars, which is so constant a practice, and which, as one notes in the great majority of cases, must not be accompanied by removal of their fellows in the mandible, gives no help in this problem of im-

pacted mandibular molars. So we are driven back again on to the hard rock of experience and we have to make our decisions on the individual facts before us, and so often we have to give our advice on this "Time" factor, and my appeal is that the "Time" factor should have and bear a very great responsibility in our attitude to the advice we give.

My desire is to straighten out some of our important difficulties, and if possible arrive at an understanding which may help us to overcome them. I realize they are of a personal character. Am I too optimistic?

Acknowledging the conditions which I have enumerated, it does seem unjust and at times impossible to obviate the cessation of treatment, but if that must arise, then there should be some method of placing on record the real facts; and it should not be possible or expected that the onus of completion should be placed on the orthodontist who has a conscientious objection to being left in the lurch.

Fig. 26.

Fig. 27.

Figs. 26 and 27.—Bilateral, postnormal. Excessive growth of maxilla. No time estimate. Actual treatment a little over two years.

You will seen from the slides (Figs. 1-27) how variable my time estimate has been—very markedly on the short side. The cases which could be recorded where the time was less than the estimate, would be considerably less. Can judicious and well-judged extractions shorten our treatments to any extent? Undoubtedly, in cases of true maxillary protrusion, it can do so, but I can see little hope that it will do so in cases which demand a complete movement of the mandible to render the occlusion perfect and to restore a facial contour which is pleasing.

If we are content to leave postnormal occlusion and only correct anterior prominence, then extraction can shorten the time estimate, but that is another story, and discrimination can be a factor if brought to a fine art.

DISCUSSION

Mr. Bulleid said that Mr. Cale-Matthews was to be congratulated on his paper, which was one that would cause them to think furiously. Of course, he rather invited them to be prophets, and the prophet's job was a very thankless one at any time. When the question was put to himself, "How long will treatment be necessary?" his usual answer was, "I will tell you in about six months' time." One really could not say at the beginning how a case would go or with what speed treatment could be accomplished until one had had some experience of the particular case in hand. After six months one was in a better position to give a tentative estimate than at the time of starting. At any rate, that was the subterfuge, if one liked to call it so, which he used in speaking to parents in order to safeguard himself. There were two other vital factors, as the author had pointed out, which needed to be taken into consideration. One of these was the age of the patient. Was it ever safe to say that a case was complete until the premolars had been erupted for at least twelve months? He would hesitate to say so. Another point that must be kept in mind was that if the child was very young, the case was likely to be longer than if the child was aged ten or eleven. The time of eruption of the premolars was the optimum time for rapid treatment. Even if one was dealing with a very young child, one could say, "Well, we can carry out certain preliminary treatment which will take, say, twelve months." He had in mind that a very large number of cases where the condition with which one had to deal was a lack of alveolar development in the posterior part of the mouth. With twelve months' use of a bite plate it was astonishing, as they all knew, how a case which apparently was hopelessly complicated, simplified itself. Often the arches appeared to broaden themselves, and, at any rate, the case greatly improved, if nothing more. Again, one had to take into account the hereditary factor. If the child was obviously developing a condition which one or other of the parents showed, one must be far more conservative than when dealing with a case where a hereditary factor was not apparent. In these hereditary cases one should not give an estimate of time required, or even an absolute prognosis, as one might do, say, in a condition which was the result of vicious habit. The abnormal growth factor was so strong that it was a question whether an ideal result would ever be attained. All that one could say in these hereditary cases was that one would do the best possible. It might be politely intimated to the father or mother, as the case might be, that they themselves were really to blame, and that the orthodontist could do only what was possible in the circumstances. If he offered to do more than that, it was very possible that he would get into deep water. As he had stated, the part of the prophet was a very difficult one to fill. He never gave a time limit before six months elapsed. As for the fee, on which the author had asked their opinions, that was a matter which had better be arranged with the parents, and he did not think it was one into which the Society could enter. He could only give the manner in which he in his own imperfect way practically "hedged" overestimating the time of treatment.

Mr. L. Russell Marsh said it occurred to him that in bringing forward this consideration of the time factor the author had rather emphasized that if they had a child six years old for treatment they had to say to the child's parents, if they were to be perfectly honest, that the treatment would take the best part of eight years. This was beacuse they could not be sure that the treatment was completed until the premolars were fully erupted. If that statement were made to the parents, the result would be quite probably that they would go somewhere else for advice. Therefore the question resolved itself into doing some preliminary treatment in the early years and letting the case rest, and then undertaking further treatment. It would be useful to know whether in Class II cases they were going in for maxillary retraction or extraction. If the former, the earlier they started the better. If extraction were decided on, the ultimate treatment could not be started until the premolars were erupted. That period in between the preliminary treatment at the early age when the child first came forward and the later age when one was going to do, presumably, extraction treatment, say at about eleven or twelve, was rather a difficulty. He heard a somewhat cynical story a little while ago, which might be considered a parallel to that situation. A man was reading a paper on

cleft palates, and definitely proved to his audience that a cleft palate should not be treated surgically during the first few months of life as had been the practice in the past. Most of the surgeons were more or less agreed, at least from the dental point of view, that if cleft palate were treated before the age of five years there was likely to be a condition of chaos in the dental arches. Later, however, the same lecturer approached one of his surgical colleagues and asked him at what age he was treating cleft palates. The answer was, "Six months." "But did you not agree," the other asked, "that it was better not to begin treatment until the age of five years?" "Yes," was the reply, "but if I do not do it at six months some one else does!" The author had brought up the question of the anxious mother and the unobservant father. That was a difficulty which one was often up against, namely, a state of affairs in which the father, who was responsible for paying the account, was not anxious about having the treatment continued, while the mother desired it to be done. The orthodontist in such a case was up against opposing forces, and if unfortunately his treatment did not seem to be going on rapidly, he was likely to be criticized by the father and by others on that side of the family. He himself had had one or two cases in which the father was definitely opposed to the treatment, while, on the other hand, the mother was bringing the child for treatment. This placed the orthodontist in a very difficult position. Among the cases which the author had shown, he noticed that those in which he had overestimated the time factor—in other words, those in which he had managed to complete treatment earlier—were all cases in which the child was getting on toward twelve years of age when treatment was started. With the younger children it was always a question of underestimating the time. He believed that this was the first occasion on which he had heard Mr. Cale-Matthews even tentatively defend extractions. When the time factor and fees were concerned, one had to present the parent with alternatives, on the one hand a long treatment which would cost money, and on the other hand what the parent might describe as a second-class treatment which would produce fairly good results in a short time and be less expensive.

Mr. Henry said that he belonged to the anti-extractionists. Nevertheless he realized that in some cases, conditions were such that, when the age of the patient, the time factor, and the difficulties of the case were considered, extraction might become necessary. In the case of young children when the teeth were in postnormal occlusion at seven or eight years of age, he always told the parents that they would need active treatment for a certain period in order to get the arches into proper relationship. Then came a period of observation until all the permanent teeth had appeared. In that way he did not have to frighten the parents by saying that treatment would extend over several years. There were certain cases where the teeth would not respond normally to tooth movement. He had two cases like that. The teeth erupted, but, although there was space for them, they could not be moved into that space, except by abnormal pressure. He was in America in 1932, and visited many colleagues there, some of whom showed him similar cases and said: "Have you come across anything like this where the teeth will not move?"—that is to say, cases where they could not get any expansion in the usual way. He therefore felt that when they encountered such a case and could not get results, it might well be due to the nonresponsive nature of the teeth.

Mr. A. T. Pitts said that Mr. Cale-Matthews had raised many controversial points on one or two of which he would like to comment. With regard to the time factor in treatment and what should be said to parents, he felt that the important thing was to make clear to them that part of the time would be devoted to actual treatment and a part to watchful supervision. If a parent was told that treatment would last up to twelve or thirteen years when the second molars were through, he might get the impression that all this time would be taken up with making and wearing a constant succession of appliances and, not unnaturally, might become alarmed. But if it were said that the responsibility of the orthodontist lasted for so many years, but that actual treatment occupied only a part of this time, then the matter was put in a better perspective. His own feelings were that in all the gross forms of malocclusion the responsibility of the orthodontist quite definitely went on until the second molars were fully in place. If, for instance, in a case of postnormal occlusion treated by an inclined plane or intermaxillary traction, stabilization had not taken place by the time the second

molars had erupted, then he doubted whether permanence would ever occur. Mr. Cale-Matthews had referred to the menace of the third molars. He was glad to see that Mr. Cale-Matthews had altered his views on this subject. Several years ago he remembered hearing him express the opinion that the eruption of the third molars tended to lock the arch and prevent relapse. Evidently he held that view no longer. He, the speaker, was of the opinion that the position of the mandibular third molar was extremely important in regard to the prognosis of the treatment of crowding. He had seen many cases which he had regarded as completed, but when some of these children had reached the late teens he had noticed some relapse evidently due to the pressure from behind of the erupting mandibular third molar. This was particularly likely to happen in those cases of crowding treated by expansion where room, but only just enough room, had been obtained. The result looked at the age of, say, thirteen years, and remained so for a time. But the slow pressure of the mandibular third molars, even if not misplaced, would be very likely to cause some relapse especially in the incisor region. In several cases he had removed a premolar on each side some time after he had completed the treatment, so as to break the line of pressure. This was an aspect of orthodontic treatment which had to be worked out more fully and to receive a greater recognition in the future than it had received in the past. In his innocence he had thought that the paper was going to be devoted chiefly to the question of the time factor in relation to extraction in the treatment of malocclusion. But evidently he had misread the title, for they had heard singularly little about the extraction of teeth. It appeared to him that Mr. Cale-Matthews took up the attitude that while the extraction of teeth might offer an inferior short cut where time was of real importance, yet where the arches wanted careful remodeling, extraction was not good treatment. With that view he disagreed. He found that he carried out the extraction of teeth as part of the treatment of irregularities in an increasing number of cases. Looking back on his practice he could remember many cases where afterward he had regretted not having removed teeth. He could not recall many cases where he had been sorry that he had extracted teeth save in some cases where he had removed a mandibular incisor and had found subsequently a collapse of the arch in front. He did not regard extraction as a second-best form of treatment. In those cases where he thought extraction was called for he carried it out irrespective of any economic or other factor as being the form of treatment likely to give the best and most permanent results.

Mr. Robert Cutler said with regard to the time factor that if one saw a child of seven or eight years and the parents asked how long the case would be under treatment, it was quite a good thing to explain that the appliances themselves were of no intrinsic value, but that all they did was to influence bone growth. As growth obviously went on to the age of thirteen or fourteen years, appliances of one sort or another which would direct the growth of bone were necessary just as the gardener directed the growth of a creeper by means of sticks and string. It was well to explain to the parents that the appliances merely guided the growth processes into normal channels. He proceeded to say that the point to which Mr. Pitts took exception in the author's remarks about extraction in postnormal cases was purely a difference in point of view. Mr. Cale-Matthews had been concerned to point out the temptation in some postnormal cases to snatch an easy victory. Often in such cases, if one saw the patient two or three years afterward, even though the parents professed themselves pleased with the result, one felt oneself rather like "Iscariot with his bag of gold," because one knew what could have been done if one had not taken the easy path and got a result which pleased the parents in a relatively short time. With regard to the overanxious mother and the unobservant father, the father being unwilling to meet his commitments, he himself had always thought that if the mother was sufficiently anxious, the father would sign unlimited checks, if only to secure peace and quiet in the house!

Mrs. Muriel Michaelis asked whether Mr. Pitts had taken into consideration the extreme difficulty in practice of persuading parents to allow extraction. The parent usually insisted on the retention of the teeth and would not allow the child to miss any teeth at all.

Mr. Cale-Matthews, in reply, said that the members had treated him more generously than he had expected. He had felt very diffident in introducing this subject, but he considered that some one should say these things, pointing out that orthodontics was not all a question, as Friel said on one occasion, in scathing terms, of "tooth pushing." Of course, there was a sense in which orthodontists were only "tooth pushers" after all, whether they liked it or not. The general question seemed to turn upon whether they were going to be philanthropists and practice orthodontics for their health, or be like the average general practitioner in dentistry who obviously and quite honestly was out for his livelihood. What he had wanted to get as a result of his paper was the experiences of those present. Mr. Pitts was perfectly straightforward. He was not an orthodontist, in the sense that he did not rely on his orthodontic practice entirely, and consequently he did not perhaps get the extraordinary difficulties of decision which the orthodontist pure and simple encountered. Any one continually treating his own patients, not patients who had been sent to him by some other practitioner who might himself have started or delayed starting treatment, and expected the orthodontist to attain the sometimes unattainable. Further, having started with the ideals of an orthodontist, it must not be imagined for one moment that the orthodontist did not put before the persons concerned the alternative treatment. These matters applied mainly to children who were perhaps the children of wealthy people, or at any rate, of people who aspired to a certain social position for their children when they were grown up. They resented the idea of any form of treatment that involved the loss of the natural teeth. Further than that, he wished again to have an opinion for their mutual benefit as to this factor of responsibility—on completion. Many of those present must have had the same experience as himself, in which, if one was willing to carry on one's contract, one might have to continue the treatment under arbitrary conditions for a very much longer period than was allowed for in the original diagnosis. Among parents, of course, one got a very large number of quite reasonable people, but occasionally one came across unreasonable people who made demands, courteously or otherwise. In these cases the orthodontist was placed in a very difficult position, and his object had been to endeavor to find out what the experience of some of those present was in regard to broken contracts where one had definitely estimated the time factor, and found oneself unable to do so within the specified period. He was pleased that so many members had given their views. Mr. Bulleid was quite right in the opinions he had advanced. One went on as well as one could. If one was dealing with one's own patients, again, having their confidence, one could explain matters to them from time to time. But if they were patients of some other practitioner, the difficulty was increased. The point he had made about extraction was this: that he would rather extract after a certain amount of treatment or even after the apparent completion of a certain type of treatment, than at the beginning of treatment. In other words, in an obstinate condition of postnormal occlusion, if he failed after a certain time to obtain a normal occlusion, not due to any anatomic condition, but to a definite lack of cooperation on the part of the patient, then he thought he would be prepared to remove the maxillary premolars and draw back the whole of the anterior teeth. But to start out one's treatment by extraction, when one had the opportunity of acquiring the ideal condition, was a course with which he could not agree. Mr. Marsh had followed somewhat on the same lines. He knew that Mr. Marsh had a very broad outlook on this subject. He pointed out quite clearly that one had to decide definitely as to whether extraction was to be the main part of one's treatment or whether one was to carry on for prolonged terms in active mechanical treatment. Mr. Henry he called a "die-hard" simply because he was, like himself, much engaged in the orthodontic ideal which originated with Angle, but had gradually come to the conclusion that it was an impossibility. The speaker believed that the ideal was more of an impossibility here than on the other side of the water. He had mentioned in his paper that they had plenty of exodontists in America to whom the third molar was said to present no difficulties. But the question of third molar eruption was a very serious one, and one of ever increasing difficulty. Mr. Pitts had again raised the question of extraction. The speaker really thought that it was a matter of the position in which one found oneself. It would be very desirable if they could talk frankly to one another sitting around a table, rather than discuss these matters under the restraints necessary in a scientific assembly. If that were done,

they would be far more helpful. The question turned again largely on the difference between the man in general practice and the man who was exclusively an orthodontist. Supposing that one had to see during one's day's work ten or a dozen children, passing from one to the other. The work might become on certain days almost a mechanical routine, a few minutes being spent with one child and an hour with another. But in the case of the man in general practice, conditions were quite different. He was required with each case to dissociate himself absolutely from what he had been doing just before. He might see only one child in a day, or perhaps two or three, and he had to pick the thing up anew every time. The technic and methods of orthodontic practice were altogether different from those of general dental practice. He was quite willing to admit Mr. Pitts' accusation that on the point mentioned he had changed his mind. He remembered the occasion quite well to which Mr. Pitts had referred, when he (the speaker) had said that the third molars were the final corner stone of perfect dentition. He had not altered his opinion there, but he thought where there was any evidence of those teeth interfering with the correction that one had made, then either they or the anterior teeth should be removed. He was not original in the idea of removing the second molars; it was advocated by some American orthodontists ten or fifteen years ago. Like Mr. Henry he thought Mr. Cutler's illustration was extraordinarily good, and he liked his idea.

THE RUSSELL ATTACHMENT AND ITS IMPROVED ADVANTAGES*

JACOB STOLZENBERG, D.D.S., BROOKLYN, N. Y.

IN MY opinion the Russell attachments permit a more efficient application with the edgewise ribbon or resilient arch wire appliance. The Russell attachments (Fig. 1) may be obtained attached or detached.

The attachment has the following qualifications:

1. Allows for simple removal and insertion of appliance.
2. Slot E (Fig. 1) can be used for round wire up to 0.022 inch, or flat wire up to 0.022 by 0.028 inch.

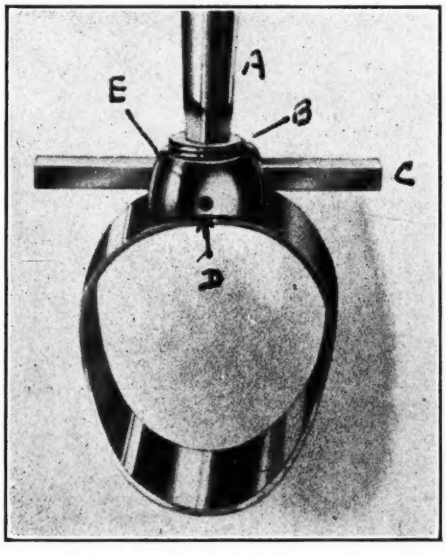


Fig. 1.—*A*, key; *B*, nut; *C*, arch wire in slot; *D*, hole passing through vertical section of attachment; *E*, slot.

3. A simple turn of the key (Fig. 1 *A*) permits the fixation or freedom of the arch wire by manipulation of the threaded nut (Fig. 1 *B*).
4. Not cumbersome.
5. Has a hole in the vertical center for ligatures (Fig. 1 *D*).
6. Can be used for universal movement of the teeth.

Appliances can be inserted without distortion because of the similarity of the anchorage attachments, and the attachments on the teeth to be regulated, which are in the same plane. The slots in attachments are all horizontal. After the appliance is inserted into the slot, the nuts are screwed into position to retain the appliance. If there are any teeth too far out of alignment, they can be ligated to the arch wire through the vertical hole (Fig.

*Read at the mid-year meeting of the Kings County Dental Society, Feb. 14, 1935.

1 *D*) with 0.012 inch soft stainless wire. The ligature is tightened periodically until the appliance can be engaged in the attachment without any traumatic stress.

The attachments may be obtained with slots for either 0.022 by 0.022 inch wire or 0.022 by 0.028 inch. These attachments can also be used by operators who favor a resilient round wire appliance up to 0.022 inch. If the operator desires to retain a tooth in a desired position after adjustments have been completed, he has only to turn the threaded nut (*B*, Fig. 1) with the key. This obviously eliminates the soldering of stops to the arch wire or the ligating of teeth to hold them together. The nuts promote greater efficiency and are a timesaver, which is a great factor when making adjustments.

The molar attachment is 0.15 inch long and 0.10 inch wide. The corners are rounded and thus eliminate the possibility of irritating the cheek in the

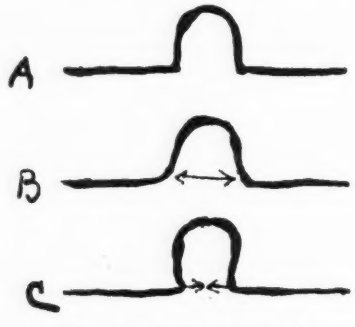


Fig. 2.—(After Pullen.)

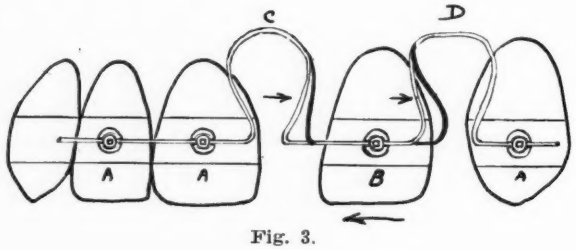


Fig. 3.

molar area. The attachment is so designed that it allows for no accumulation of food between the attachment and the band. At the choice of the operator, flat or round wire can be used, and teeth can be moved bodily or by inclination. Movement of teeth can be obtained by either tightening the nut or releasing it. Such manipulation can be best determined by the operator. In the following illustrations I shall try to demonstrate some of the uses of the Russell attachments. The edgewise arch technic has been ably described by R. H. W. Strang, in his textbook of orthodontia. In my opinion the edgewise technic can be simplified by the use of the Russell attachment. The resilient arch wire, 22 gauge, combined with the spring loop makes an efficient and effective appliance.

"The spring loop as included in a lingual or labial arch wire, usually anterior to the anchor tubes, acts to extend or contract the arc of the arch wire, thereby increasing its length as desired, taking the place of the screw

principle in the threaded alignment arch for the same purpose. The spring loop may be included at any point along the line of the labial arch wire where it is desirable to open or close spaces between teeth." Fig. 2* illustrates the simple spring loop at *A*, and it changes in form at *B* and *C* for extensibility and contractability respectively.

Fig. 3 demonstrates the application of the spring loop. The left central incisor has drifted distally into the position of the missing left lateral incisor, Russell bands on 6421 | 136. Tighten nuts 631 | 36, open loop *C* in direction of arrow; tighten nut *B;* loop *D* is contracted with residual force stored to drive 1 mesial.

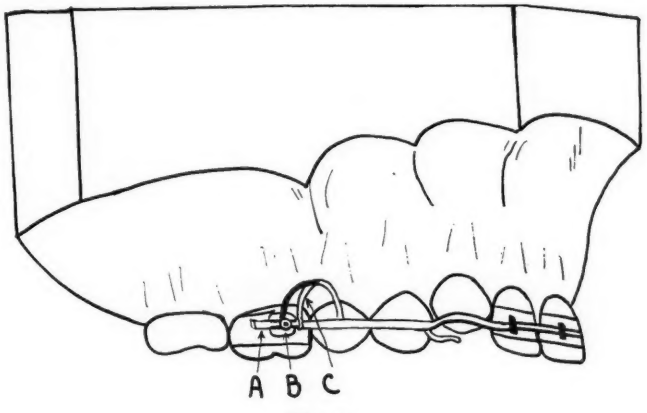


Fig. 4.

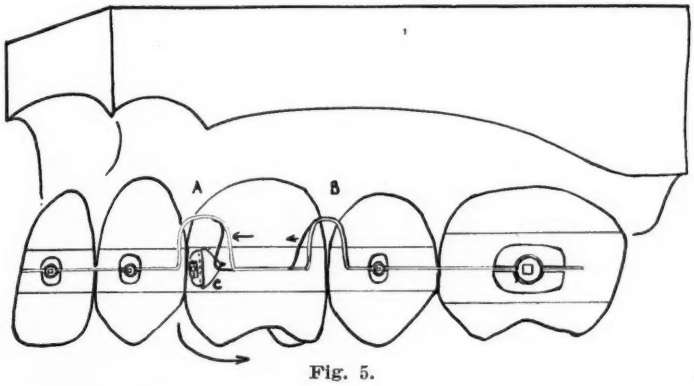


Fig. 5.

Action: When the nut is tightened on the left central incisor, loop *C* will pull and loop *D* will push the left central incisor to median line.

For a similar desired movement, loops *D* and *C* can be omitted; nut *A* is tightened; nut *B* remains loose, and the left central incisor is ligated to the right central incisor, which is held firm by the nut.

Fig. 4 demonstrates the simplicity of adjusting anchor teeth for distal movement. The nut *B* is removed from the molar attachment; the arch wire (*A*) is slipped out of the slot; the spring (*C*) is sprung distal; and the arch wire is forced back into the slot with the spring adjusted for distal movement and the nut reinserted.

*Pullen: Internat. J. Ortho. 19: 994, 1933.

Fig. 5 demonstrates the application of a double loop in an 0.020 inch round wire for rotating premolars. Maxillary left first premolar is rotated mesially. The Russell attachment is placed toward the mesial angle of the tooth. The Russell attachments on the adjacent teeth are placed in the middle third of the tooth in the center of the buccal surfaces. An 0.020 inch round wire is inserted with a double loop in the area of the premolars, the nuts on the adjacent canine and second premolar are set firm. Loop *A* is contracted by ligature which engages the corner of the base of the loop, and passes through the Russell attachment on the tooth to be rotated. This also

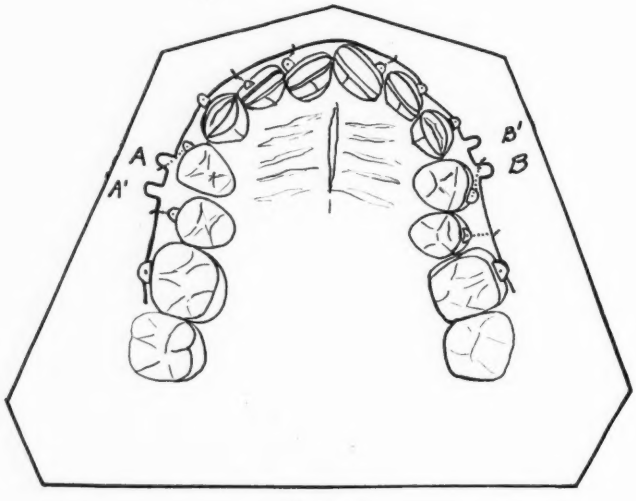


Fig. 6.

causes the extension of Loop *B*, which takes up any pull action that is exerted in the molar. The action of the spring to return to its original form demonstrates the ensuing action. Loop *A* returns to its original form and will rotate the tooth while loop *B* will turn to its original form without causing any distortion of the first molar.

Fig. 6 demonstrates an assemblage of an 0.020 inch round labial wire for lining up the arch and rotations to be done with ligature wires preparatory to inserting an edgewise arch as described by Strang in his textbook on orthodontia.

TECHNIC FOR CONSTRUCTION OF ONE PIECE STAINLESS STEEL ARCHES WITH AUXILIARY SPRINGS (WITHOUT SOLDERING OR WELDING)*

MURRAY L. SIMON, D.D.S., L.D.S., TORONTO, CANADA

THIS clinic is of practical nature; it assumes that stainless steel is of proved value in orthodontics.

During the past year a great percentage of clinics presented at the American orthodontic meetings dealt with the manipulation of this metal, indicating a warranted interest because of its practicability and economy.

Undoubtedly stainless steel would have been more extensively used if the difficulty of soldering had been eliminated. In fine gauges of stainless steel, soldering softens the metal and greatly impairs its original qualities. Therefore, once a satisfactory method of making attachments to stainless steel becomes available, its more universal application will follow. It is with this object in view that a method has been developed from recent researches which constitutes a departure from previous practice.

I am deeply indebted to Dr. Franz Meyer, the associate of Dr. Paul Simon of Berlin, for suggestions and research findings. In the process of a series of experiments in its applications in an orthodontic clinic, the success met by this procedure has warranted the discontinuance of the use of precious metals. In each case, the clinician wishes to report most satisfactory results.

The technic includes the construction of a one piece continuous arch with the addition of auxiliary sections without resorting to soldering or welding. It merely demands proficiency in wire bending. At the same time, the hazard of punishing this metal, which is always present in precious metals, is eliminated in that increased manipulation of stainless steel enhances its inherent qualities of strength and elasticity.

I am aware of the handicaps in the management of stainless steel by soldering; hence, I feel that the use of the technic to be described eliminates the difficulties encountered in constructing orthodontic appliances of this metal.

The use of stainless steel wires of fine gauges is permissible and advisable. For labial arches, either 21 or 22 gauge has been found most suitable; for lingual arches, 22 gauge. For auxiliary springs, 26 gauge, for auxiliary sections 25 gauge is used. These finer gauges of wire facilitate its bending and contouring.

The elasticity of stainless steel is far greater than that of platinum alloys, particularly when the wire is worked by this bending technic.

*Clinic presented before the Great Lakes Orthodontic Society, Jan. 28, 29, 1935.

CONSTRUCTION OF THE SIMPLE LABIAL EXPANSION ARCH

Stainless steel bands are made for the molars. These may be either of the seamless type or lap-joint bands. The latter may be made for the individual molars by soldering or welding the joint on the lingual side of the band.

Oval tubes are soldered to the labial surfaces of the molar bands. These are placed in the usual manner by adjusting them so that when arch wires are fitted to each tube, the wires cross in the desired position at the median line. (Tubing may be secured in the oval form from supply houses or may be made from 16 gauge round tubing, by placing wire of a smaller gauge within the tubing and hammering the tubing against a metal plate until the sides are flattened sufficiently to produce the desired shape.)

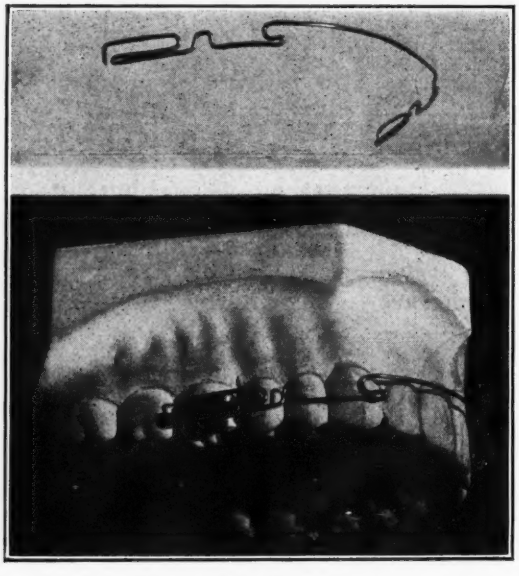


Fig. 1.

The end of a 22 gauge or 21 gauge arch wire is bent on its own axis and adjusted so that the doubled end portion fits snugly into the oval tube. Then the remainder of the arch wire is conformed to the teeth. A similar bend is made at the tube on the molar band on the opposite side. By spreading the doubled end sections at the ends of the arch wire, it may be locked more securely in place. A firmer means of stabilizing the appliance may be attained by continuing an extension from the doubled end portion over and behind the tube as shown in Fig. 1.

If the use of intermaxillary hooks becomes necessary, the arch wire may be bent in the canine region into the desired form of a hook, carrying the arch wire up and around the gingival margins of the anterior teeth. A similar bend is made at the opposite canine region, forming another intermaxillary hook. Then, the arch wire is conformed to the premolar region and carried into the corresponding tube, Fig. 1.

METHOD OF ATTACKING AUXILIARY SPRING SECTION

Provision for a double anterior arch for retracting the anterior teeth bodily without soldering may be made by attaching this auxiliary section in the following manner: After the bend is made in the main arch wire for the intermaxillary hooks, as previously described, the arch wire is continued upward and formed into a U or round bend as illustrated in Fig. 2. The wire

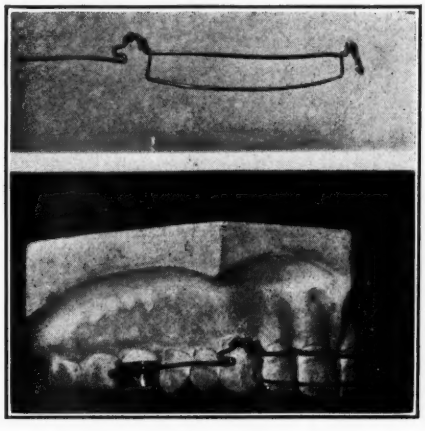


Fig. 2.

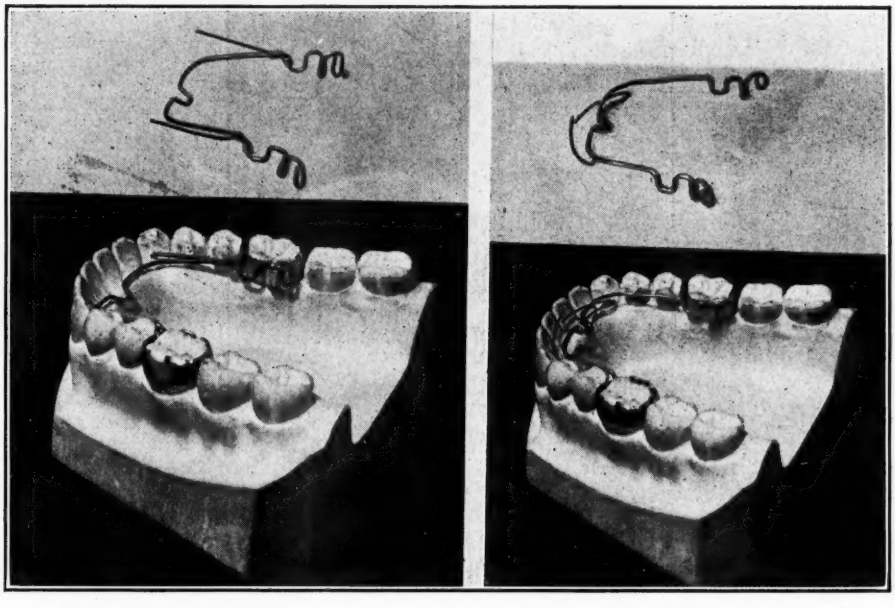


Fig. 3. Fig. 4.

is continued across the anterior region, making a similar bend in front of the opposite intermaxillary hook. Then the auxiliary section is attached by coiling 25 gauge wire around the distal upright of the U bend and carrying it to the mesial upright by winding the wire three times around this section. It is continued under the main arch wire and conformed to a desired contour across the incisal third of the anterior teeth as shown in Fig. 2. This auxiliary

section is completed by attachment in the same manner on the opposite side where provision for a U section has been made previously.

At the point where these sections are to be attached, it is advisable to carry the intermaxillary hooks posterior to their usual position, to provide space for the bend without diminishing the over-all length of the auxiliary section.

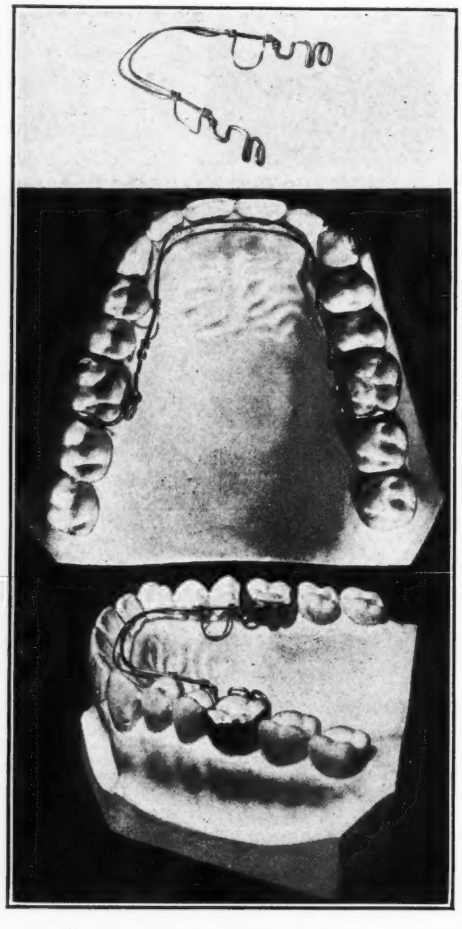


Fig. 5.

CONSTRUCTION OF LINGUAL ARCH WITH METHOD OF ATTACHING AUXILIARY SPRINGS

Oval or half round tubes are soldered on the lingual surfaces of the molar bands in a vertical position. Arch wire of 22 gauge is bent into a doubled end similar to the Ellis attachment of the one piece arch. This end may be spread later so that the section locks more securely into the tube. A distal extension is allowed to remain in order that a coil lock may be formed which holds the main arch more firmly in position when pressed against the band. Anteriorly the arch wire is bent to conform approximately with the tooth, and is carried around to the tube on the opposite molar band, where the arch wire is again bent on its own axis to form an upright which fits into the vertical tube. Then the wire is coiled to form a lock.

Auxiliary springs may be attached by making a U bend in the main arch wire in the region where the spring is to be added. The attachment may be made as previously described in Fig. 2 or as advocated by Dr. Paul Simon of Berlin, namely, by commencing to coil 26 gauge wire at the mesial upright of the U tube and continuing it along the main arch wire and coiling three times. It is then continued under the main arch wire to the length desired as shown in Fig. 3.

These auxiliary springs may be made in the premolar regions as in Fig. 3 or in the anterior region as shown in Fig. 4.

A trolley auxiliary spring may be formed by commencing the attachment at the U bend in the premolar region at the upper mesial corner of the upright, carrying the wire a little anteriorly and making a loop to extend toward

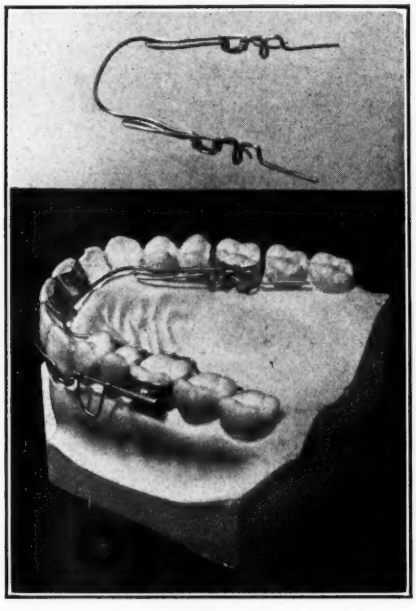


Fig. 6.

the palate. It is then coiled around the main arch wire three times and carried under it following the arch to conform with the teeth to be moved anteriorly. The trolley is completed by continuing the wire around to the opposite side and constructing a similar loop with its spring. (Fig. 5.)

CONSTRUCTION OF A LINGUAL APPLIANCE USING RECURVED FINGER SPRING WITH LOCK EXTENSION

The main lingual arch is made in the usual manner, making a U-shaped bend at the interproximal space between the second premolar and the first permanent molar. The posterior portion of the arch is continued to extend so that it engages the lingual surfaces of the second molars. This additional length provides for reinforced anchorage.

A recurved auxiliary spring for buccal movement of the premolar area may be made by coiling 26 gauge stainless steel wire around the U bend in

the main arch wire, commencing the attachment at the distal upright of the section and carrying the wire on to the mesial upright and coiling again. Then the wire is continued anteriorly along the main arch wire to the mesial surface of the first premolar, bent on itself so that the spring formed rests against the lingual surfaces of both premolars.

If a more rigid locking device for the main arch is desired, it may be provided while attaching the auxiliary spring in the premolar area. By leaving excess at the point that the coil is commenced on the distal upright of the U bend, an extra piece of wire is allowed for the lock. This is constructed by conforming this end piece over and against the vertical tube which receives the main arch wire. The elasticity of the spring wire locks the main arch in a rigid position. (Fig. 6.)

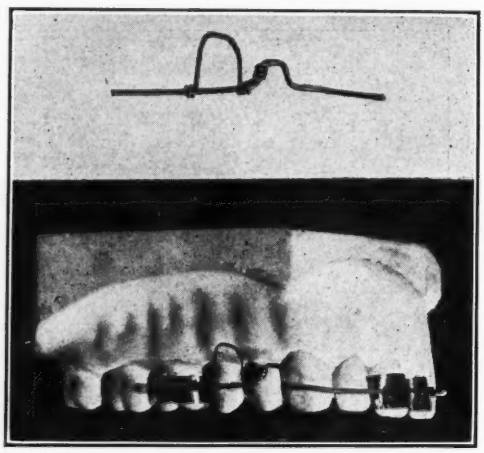


Fig. 7.

CONSTRUCTION OF LOOP SPRING ON LABIAL ARCH

In constructing the loop spring on the labial arch as a substitute for a threaded-end section, a U bend is made anterior to the point where the loop is to be commenced. The loop spring is attached either by starting the coil with 23 gauge wire on the mesial upright of the U bend and extending to the distal upright or by commencing the coil at the distal upright of the U bend and continuing a little posteriorly on the main arch wire and coiling again. The loop is made and finished in the usual manner, allowing the posterior coil of the finished loop to rest against the horizontal tube on the molar band, (Fig. 7.)

Research work for this clinic was done in collaboration with Saul Simon, D.D.S., L.D.S., B.Sc. (Dent.).

A CROSS-BITE CASE*

GEORGE R. MOORE, D.D.S., ANN ARBOR, MICH.

THE treatment of a case of normal anteroposterior relation of the dental arches in which there exists a linguoclusion of the maxillary teeth on the left side, otherwise termed a crossbite, is herewith presented.

It was my purpose to restore optimal functional possibilities for this patient as early as possible in order to prepare the way for further dentofacial development along individual lines unhampered by orthodontic appliances. Having previously been fairly successful in the treatment of similar cases with the removable lingual appliance, using vertical half round attachments on the normal side and horizontal round on the abnormal side, I was desirous of attempting the treatment of one of these cases with the exclusive use of a round labial arch wire. I cannot say now that I prefer the use of the labial over the lingual arch. In fact, the reverse is true.

History.—In September, 1926, the patient, a boy, aged eight years, was first examined. He was accompanied at the time by his brachycephalic German father and his dolichocephalic English mother. It was apparent that the boy's head development was very similar to that of his father, who possessed a mesioclusion with perhaps more of a maxillary deficiency than a mandibular overgrowth. The boy's malocclusion, being a crossbite, however, exhibited quite a different form from what would be expected. (Figs. 1 and 2.)

The mother exhibited a mild degree of bimaxillary crowding with a normal anteroposterior relation of the arches. She reported a normal pregnancy and normal birth for the child. The child was artificially fed during infancy. The extent of his illnesses during infancy and early childhood were as follows: (1) a light case of whooping cough at ten months, (2) a rather severe case of bronchitis at three years, (3) a severe left cervical adenitis at six years, followed by the removal of badly infected tonsils and adenoids within a few months. His dentition both deciduous and permanent was retarded. The mother could recall no pernicious habits of breathing, tongue, lip, thumb, or pillowing.

Etiology.—On the subject of etiology of the crossbite condition very little can be said. The similarity, however, of dentofacial development existing between father and son, especially since both exhibit an underdeveloped maxilla with a borderline overdevelopment of the mandible, suggests an hereditary origin for the developmental or prefunctional phase of the case at least.

Diagnosis.—Casts of the denture were made from plaster impressions. Radiographs showed all permanent teeth present except the third molars, whose crypts did not yet show at that age. The mandibular left second premolar appeared wider than normal mesiodistally in the radiograph (Fig. 3). A study of

*Presented to the American Board of Orthodontia.

the casts with all other data led to the diagnosis of unilateral (left) linguoclusion of maxillary permanent central and lateral incisors, deciduous canine, first and second deciduous molars, and first permanent molar.

Treatment.—In accordance with my policy wherever practicable, I was determined in this case to institute a minimum of mechanical interference in the hope that natural forces would work out further dentofacial development along more physiologic lines than would be possible under the added stimulus

Fig. 1. Fig. 2.

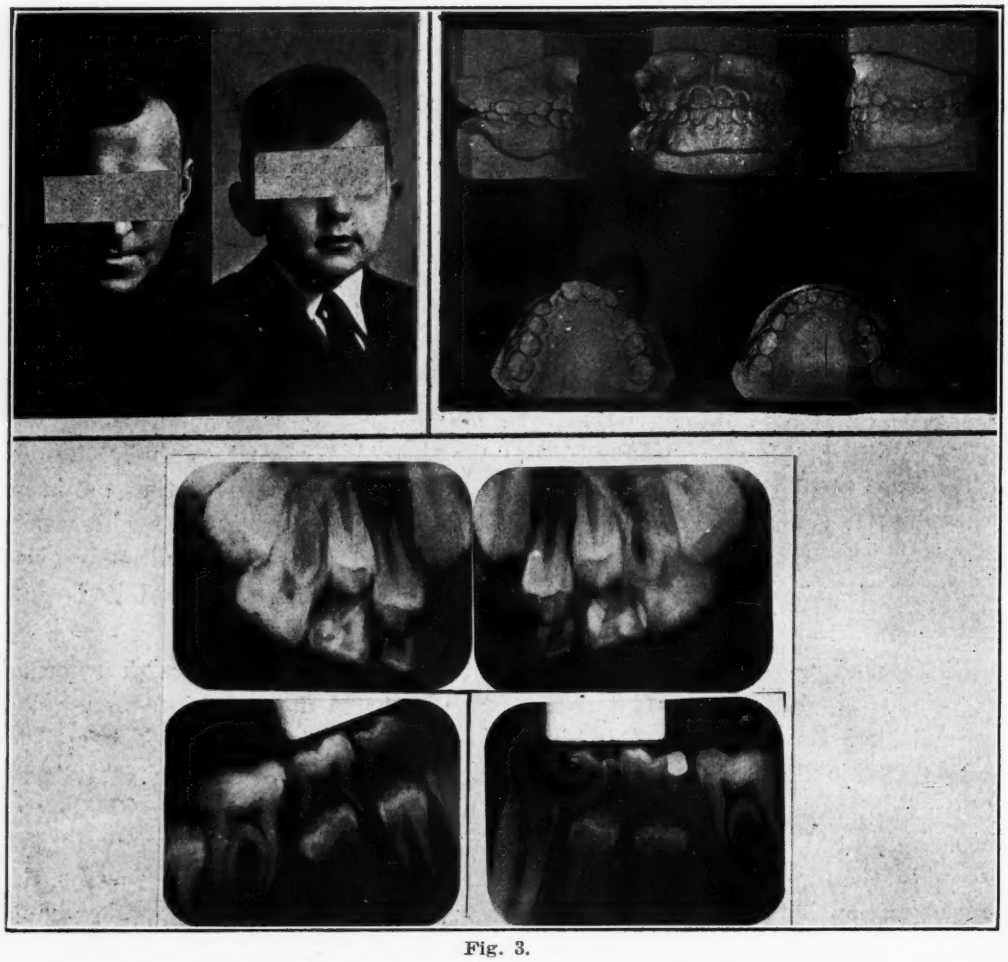


Fig. 3.

Fig. 1.—Photographs of father and son before son's treatment.
Fig. 2.—Casts made before treatment.
Fig. 3.—Note malformed left mandibular second premolar.

of orthodontic appliances. It was therefore my purpose to restore a normal functional relationship on the left side, and, although I had been in the habit of treating similar cases with the lingual wire, this time I chose a plain round labial arch wire as shown in Fig. 4.

Only the maxillary arch was equipped with appliances, there being need for only three bands the first two months, and four thereafter, namely, those on right and left first permanent and first deciduous molars. On the right, or nor-

mal side, the first deciduous molar band was equipped with a soldered lingual arch section engaging the lingual cervical surfaces of the deciduous canine and second deciduous molar, and on the buccal cervical surface with a McCoy open

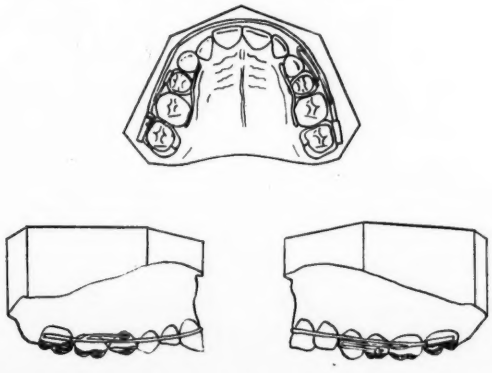


Fig. 4.—Drawings to illustrate treatment method. Left side lingual.

Fig. 5. Fig. 6.

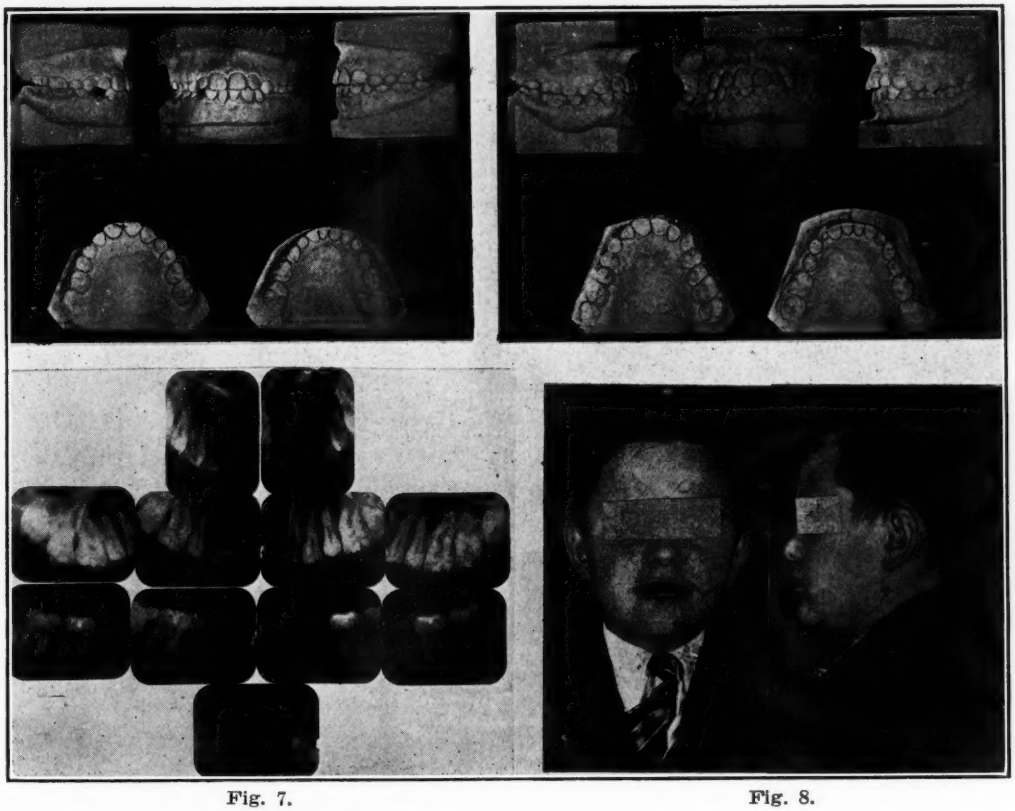


Fig. 7. Fig. 8.

Fig. 5.—Casts made February, 1927
Fig. 6.—Casts made January, 1932.
Fig. 7.—Radiographs made January, 1932.
Fig. 8.—Photographs made January, 1932.

tube to receive a short 0.030 inch horizontal spur. Acting as a stop at the anterior end of the buccal tube on the right first permanent molar band, there was soldered on the labial wire a spur extending occlusally into contact with

the band under another small spur. In this way expansion stress in the labial wire was not permitted to exert a tipping effect on this, the normal, side, which condition favored buccal tipping of teeth on the abnormal side.

On the left, or abnormal side, where the teeth were all in lingual relation, the first permanent molar was likewise equipped with a horizontal round tube to admit the labial wire. Using simple expansion stress in the labial wire the first permanent molar was brought into buccal relation. The left first deciduous molar was then banded and also equipped with a lingual arch section, engaging canine and second deciduous molar. In addition, on its buccal occlusal surface slightly distal was soldered a vertical hook bent with free end upward to receive a reflex spring of 0.018 inch material attached to the labial wire farther distally. Being light, the reflex was effective in stimulating development of the remainder of that side. In fact, although the maxillary left central incisor and lateral incisor received no direct application of stress, they also came soon after into labial relation apparently as a result of the stimulus. Fig. 5 shows that the lateral incisor is not rotated into normal alignment at this time, but it was on account of favorable response indirectly to the stress that I looked upon developmental possibilities of this case as being favorable.

Results.—Treatment was started September 17, 1926, and all appliances were removed on February 3, 1927, four months and sixteen days later. The second casts were made in April, 1927, to record the post-treatment condition, and the patient was not seen from then until June, 1928, when the occlusion looked better than in 1927. Casts, photographs, and radiographs, shown in Figs. 6, 7, and 8, were made Jan. 2, 1932. The condition of the maxillary left lateral incisor is not ideal, but a functional optimum and an esthetic near optimum have been obtained, for which no apologies need be made when the discrepancy in mesiodistal diameter of a malformed mandibular premolar is considered.

If I were treating this case again, my treatment would be dominated by a similar attitude. As for the type of appliance used, I have found the labial wire equally efficient, but not so simple and hygienic as the lingual wire in the treatment of cases of this type.

TREATMENT OF BILATERAL DISTOCLUSION COMPLICATED BY IMPACTION OF BOTH MANDIBULAR SECOND PREMOLARS*

C. J. Vosmik, D.D.S., Cleveland, Ohio

History.—Girl, aged ten years, weight sixty-six pounds, height fifty-three inches. The dental arches of both the father and the mother were in normal relationship. Of four children in the family two presented a normal relationship of the dental arches and two possessed distoclusions. During pregnancy the mother's health and diet had been normal. Weight of child at birth was seven pounds and six ounces. Child was placed on diet of cow's milk from time of birth. Severe case of malnutrition developed at six months. Child was then placed on synthetic diet, and improvement was noticed. Tonsils and adenoids were removed at five and a half years. Childhood diseases consisted of measles at seven years and chickenpox at eight and a half years. Child was a mouth-breather but had no sucking or pillowing habits. At the time the patient presented for orthodontic treatment, general health was normal.

Oral examination revealed hypoplasia of all incisors and first molars.

Radiographic examination revealed the presence of unerupted mandibular right and left second premolars.

Fig. 1 shows extraoral radiographs taken before treatment was begun, June, 1927.

Attributed Etiology.—Malnutrition and mouth-breathing may be considered the etiologic factors causing malocclusion.

Diagnosis.—Impressions were taken and casts of the denture were constructed. The malocclusion was classified as a bilateral distoclusion with a marked linguoclusion of all teeth in the mandibular arch anterior to and including the first premolars.

Fig. 2 shows views of the casts made in June, 1927, before treatment was begun.

Treatment.—The teeth and dental arches were restored to a normal functional and anatomic relationship by the following plan of treatment: (1) lateral expansion of both the maxillary and the mandibular arches; (2) removal of points of interference by the alignment of the maxillary incisors; (3) space provided for the eruption of mandibular second premolars by the labial movement of all mandibular teeth anterior to and including the first premolars; and (4) a change in the relationship of the maxillary and mandibular arches.

Molar bands carrying half round lingual tubes and 0.040 inch buccal tubes were placed on the four first molars. Bands with lingual spurs were placed on the four maxillary incisors. Removable lingual wires carrying compound auxiliary springs in the region of premolars and canines were placed in both the

*Presented to the American Board of Orthodontia, May, 1932.

maxillary and the mandibular dental arches. Labial wires constructed of 0.040 inch round wire carrying spring loops of 0.025 inch wire just anterior to the buccal tubes were also placed in both the maxillary and the mandibular dental arches. The maxillary labial wire carried hooks for intermaxillary elastics.

The incisor teeth in both the maxilla and the mandible were moved labially and rotated where necessary by ligating them to the labial wire with wire ligatures. Intermaxillary elastics were used from the time treatment was begun.

Fig. 1.

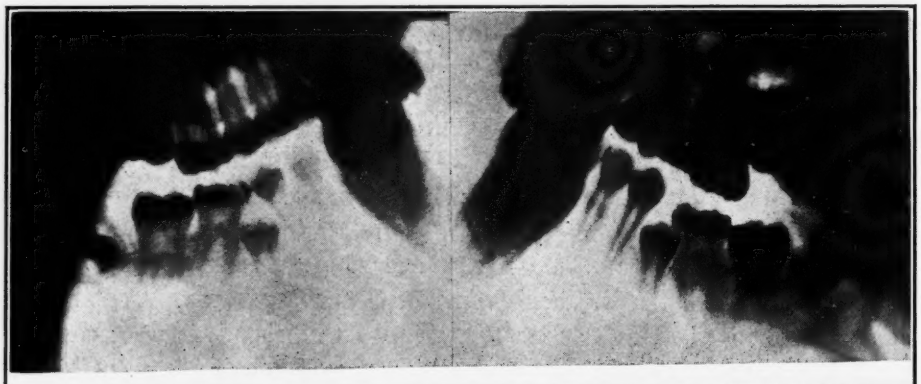
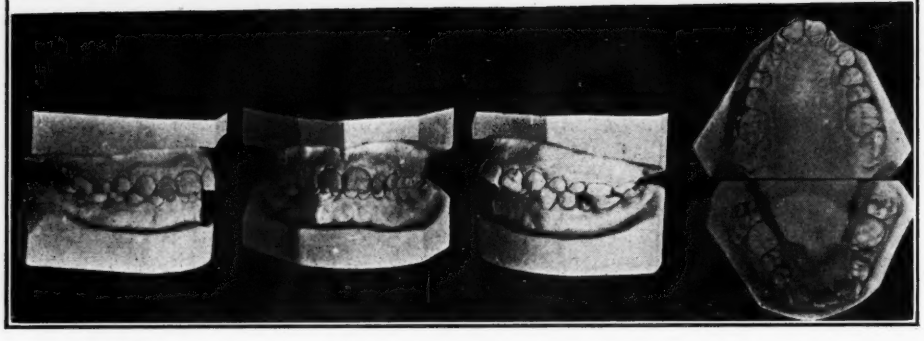


Fig. 2.

Fig. 3.



Results.—The patient presented for treatment June, 1927. Treatment progressed satisfactorily until July, 1928, when a severe infection developed in the crypt of the partially erupted mandibular left second molar. This necessitated the removal of all appliances for a period of two months, during which time the patient was under the care of an oral surgeon.

Fig. 3 shows views of casts taken at this time.

September, 1928, the appliances were reinserted, and the treatment was then continued until February, 1930, when all appliances were removed and a

Hawley retainer was placed in the maxillary dental arch while a lingual retaining wire was placed in the mandibular dental arch. The retainers were removed February, 1931.

Extraoral radiographs, Fig. 4, taken in March, 1932, show impacted mandibular third molars. Surgical removal will probably be necessary.

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 5 shows views of casts made March, 1932.

Fig. 6 shows views of patient taken March, 1932.

Prognosis.—Although the appliances were removed only a year ago, there has been so slight a change in the dentures since that time that prognosis may be considered favorable for the maintenance of a normal functional and anatomic relationship.

Department of Dentistry for Children

RELATION OF THE ENDOCRINES TO THE TEETH

An Analysis of the Literature

T. A. Grant, D.D.S., Savannah, Ga.

THERE are eight glands generally recognized as glands of internal secretion: pituitary, thyroid, parathyroid, sex glands or gonads, thymus, pineal, interrenal or adrenal, and the isles of Langerhans in the pancreas. The construction of these glands is simple tubular, compound tubular, or racemose (meaning "resembling a bunch of grapes"). They have no ducts leading from them, but they all have a very rich blood supply. Their secretions are called hormones, which means to act or to arouse. These hormones are immediately picked up by the blood stream and are carried to all parts of the body. When the hormones reach certain organs of the body, they have the power of causing increased activity of these organs. The entire metabolism of the body depends upon their proper functioning.

PITUITARY GLAND

The pituitary gland is located at the base of the brain in the sella turcica of the sphenoid bone. It is a compound racemose gland composed of an anterior and a posterior lobe. The anterior lobe is composed of epithelium and originates in the fetus from the diverticulum of the oral cavity. The posterior lobe is composed of nervous tissue and is a forward growth from the brain in the embryo. The anterior lobe is generally supposed to produce two hormones controlling growth and stimulation of the development of the sexual glands. Some authorities, among them H. R. Rony, say there is another hormone, thyrotropin, the function of which is to stimulate the growth of the thyroid gland. This theory is generally borne out by the fact that many authorities report a hypofunction of the thyroid with a hypofunction of the pituitary.

The growth hormone of the anterior lobe is essential to growth, and development will not take place without it. Pituitary deficiency in early life will result in dwarfism or infantilism, lack of development of gonads, underdevelopment of the mandible and the nose. The hands and the feet will be short and stubby, and sometimes the joints of the fingers have great latitude of movement and are said to be double jointed. The mentality is low. The epiphyses close late in life; normally they should close around seventeen or eighteen years, but they may be delayed to twenty or twenty-five years.

Read before the First District Dental Society of Georgia, July 8, 1935.

Hyperfunction of the pituitary will result in rapid and giant growth if it takes place before the closure of the epiphyses. Early puberty will result, and the epiphyses will close earlier than normal. If the excessive secretion takes place after puberty, the result is acromegaly, in which the nose, mandible, hands, and feet are greatly enlarged. X-ray examination of the hands will disclose tufts or bony enlargements of the tips of the phalanges. The excessive development of the mandible causes a Class III malocclusion with a spacing of the mandibular teeth.

C. C. Howard is inclined to question the fact that acromegaly develops only in adults. He reports several cases in his practice in which an anterior relationship of the mandible existed, and there were pronounced acromegalic tendencies. These patients responded very slowly to treatment, and when the teeth were released they invariably returned to their abnormal position.

W. G. Downs reports a number of experiments of acromegaly being produced in animals by overfeeding of pituitrin, the extract of the anterior lobe. Other animals were operated on and the pituitary gland was removed. These were the same age and were litter mates of the ones artificially fed. These animals were small and underdeveloped, whereas the others were very large with large feet and heavy jaws. A peculiar fact about the experiment was that there was no change in the structure of the teeth, and no more decay in one set than in the other. The acromegalic dogs had spaced teeth from the bony enlargement. These experiments were comprehensive, as nearly three thousand animals of various kinds were used.

A posterior lobe pituitary hypofunction will result in obesity. This obesity is characterized by a general distribution of the fat and a retention of the figure, as compared with thyroid hypofunction in which the individual is so fat that he looks "straight up and down." Howard and others report that practically all these obese persons have normal arches, normal occlusion, and are almost free from cavities. They offer no explanation.

THYROID

The thyroid glands are two in number and are located on either side of the trachea. They are compound racemose glands. Their secretion is known as thyroxin, and it can be prepared artificially. The thyroid glands have a distinct effect upon growth, and congenital absence results in cretinism. This is characterized by smallness of stature, thick neck, short arms and legs, prominent abdomen, large head, and weak mentality. The teeth erupt very late. Many authorities report many congenitally missing teeth.

In hypothyroidism the patient is obese with a "straight up and down" figure. Contrary to Howard's observation, many writers claim that thyroid deficiency causes tardy eruption of teeth, irregularity, and caries. They offer no proof, however, and we know that all these conditions may exist in the mouth of an otherwise normal individual.

When the thyroid gland degenerates or is removed, myxedema results. This is a condition in which the skin becomes thick and dry, and pigmentation

takes place. Ingestion of thyroid extract considerably improves this condition. The temperature and the blood pressure are high in myxedema and low in cretinism.

Hyperthyroidism, according to most authors, causes early eruption of the teeth with little decay, and the teeth are larger. There is rapid growth and development of the individual. There is a great resemblance of the symptoms in hypopituitarism and hypothyroidism, and this leads me to believe that there is seldom a dysfunction of one without a dysfunction of the other, and the end-result of each dysfunction is similar to that of the other. Rony says that growth will take place slowly with an absence of the thyroid secretion, but will take place more rapidly if it is present. If the growth hormone of the pituitary body is absent, however, growth will not take place at all, even though the thyroid extract be present.

PARATHYROID

The parathyroid glands are located by and partly imbedded in the thyroid glands. They regulate calcium metabolism. H. J. Achard, along with other writers, reports experiments on rabbits in which the parathyroids were removed, and white decalcified areas appeared on the teeth. Feeding of calcium or parathyroid extract had no effect, but when parathyroid tissue was grafted into the spleen or muscle tissue, these areas disappeared and did not recur. The general opinion is that the parathyroids exert an important influence on the calcification of human teeth in early life but do not affect the teeth after calcification is complete. In some of the lower animals the teeth continue to calcify, which accounts for decalcification after removal of the parathyroids. Loss of the parathyroids results in tetany; this mostly affects children.

GONADS OR SEX GLANDS

The gonads, or sex glands, have a great influence on calcification of the bones, teeth, and closure of the epiphyses. Hypogonadism is characterized by continued growth long after the time of maturity. The epiphysial junctions do not close, and there is excessive growth of the long bones as a result. Puberty sometimes is delayed until twenty to twenty-five years, or, if there is a complete absence of this secretion, it does not occur at all. These individuals usually are very tall and present narrow, crowded arches with poor calcification of the jaws and teeth. The entire skeletal framework is similar in this respect. The excessive growth of these individuals has an analogy in the caponizing of fowls and in the castration of animals to increase their size. Hyperfunction of the gonads results in early puberty with an early closure of the epiphyses with a short stature and hypercalcification of the bones and teeth. The pituitary hormone stimulates the development of the sex glands, and a hypofunction of the anterior lobe of the pituitary will result in lack of development of the sex glands and also a lack of skeletal growth, resulting in infantilism. If the sex hormone alone is deficient, skeletal growth will take place, as the pituitary gland will promote growth.

THYMUS

The thymus gland is located behind the upper third of the sternum. It attains its maximum size at the age of two years, begins to atrophy, and is almost gone by the age of puberty. Its function is vague. It is believed to exert some effect upon growth. Achard and Louis Berman claim that if the thymus gland is overactive, it will affect the size, shape, and color of the teeth, but they offer no proof of this statement. Several writers do not include the thymus in the endocrine group.

PINEAL

The pineal gland is located in the cranium at the base of the brain. It is larger in the male than in the female, and is larger in the child than in the adult. Some writers do not include it in the endocrine group, but the majority do. Biddle and others claim that it exerts an inhibitory influence on the development of the sex glands. If there is hypofunction of the gland, the sex glands will develop early with a precocious puberty resulting. If it continues active after time for its atrophy, then puberty is late. The anterior lobe of the pituitary seems to assume control as the pineal gland wanes. It seems to have no direct effect upon the teeth.

ADRENAL

The adrenal glands are situated above the kidneys on each side. They are composed of a medulla and a cortex, and each has an internal secretion, namely adrenalin and cortin. Hypofunction of this gland results in Addison's disease, for which cortin is a specific. Hyperfunction causes diseases of the heart and kidney, high blood pressure, and blood sugar. The secretions of these glands control the functioning of all the protective organs of the body and the muscle tone of those muscles supplied by the sympathetic nervous system. Adrenalin furnishes a protection against infection and is a necessity to life. It is claimed by many that the adrenotrope, or a person having hyperfunction of the adrenal glands, has long, strong canines, which are indicative of an aggressive nature. This is generally reported in most papers, but no proof is offered that any particular gland affects any one particular tooth more than the others.

THE ISLES OF LANGERHANS

The isles of Langerhans are located in the pancreas. The hormone isolated from this gland is known as insulin. This hormone controls and regulates carbohydrate metabolism. Disease of this gland results in diabetes, asthma, and impotence. The teeth and gums are often affected in diabetic patients.

C. C. Howard in one of his articles presents the tabulated results of two thousand and four hundred x-ray pictures of the hands of both boys and girls. Beginning at the age of five years and going through sixteen years, he examined by x-ray the hands of fifty boys and fifty girls of each age. His object was to prove that certain skeletal characteristics occurred at certain ages, and he took enough pictures to prove his point. His work is a valuable asset to the

study of bone development. The x-ray pictures of the hands of the females showed earlier development and earlier closing of the epiphyses than those of the males. The sesamoid bone begins to form at the age of nine in some of the females; whereas it did not show up in a single male hand until eleven years. At eleven years all fifty females had all eight carpals present, and this was not true of the males until thirteen years.

X-ray pictures of the hands are the best method of detecting whether there are normal skeletal growth and proper bone development for the age of the individual; and, if there is too rapid development or lack of development, some endocrine dysfunction may be suspected.

Normal growth is very valuable to the orthodontist, and it is to his advantage to see that it is taking place.

Most of the literature on the relation of the endocrines to the teeth has been written by physicians, and in their eagerness to make the subject of more interest and importance to us, I believe that they have often made statements for which they have no proof, and which have no foundation in fact. Many of them go so far as to say that a certain endocrine gland governs a certain tooth. Some claim that the entire individual is dominated by the influence of a certain gland. For example, individuals dominated by the thymus gland have small, blue-white teeth with low cusps and low resistance to caries. Thyrocentric people have pearly white teeth with a lot of decay. The gonad and adrenal types have yellow hard teeth with little decay. Another writer claims that a missing lateral incisor indicates a missing or undeveloped gonad on the same side as the missing lateral. Still another writer observes that it is peculiar that a missing lateral incisor is always indicative that the gonad on the opposite side is missing or undeveloped. Many writers claim that the lateral incisors and gonads are linked together and that any irregularity of the sex glands is reflected in the lateral incisors. These statements are backed by no more proof than the casual observations of the writers.

I believe that most of such irregularities are congenital and are an indication of some degeneration in that strain. It is widely believed that many congenital endocrine disturbances are the result of inherited syphilis and inherent tuberculous symptoms. There is no doubt of the profound influence of the ductless glands on the development of the body, but to say that a certain glandular dysfunction will affect one tooth and that another gland will always affect another tooth seems a little far fetched. W. G. Downs says that after examining hundreds of cases of all types of endocrine diseases, he has found that no particular dental anomaly accompanies the disease of any particular gland. He has found that missing teeth, supernumerary teeth, decay, pyorrhea, malocclusion, and other dental troubles occur frequently in these endocrine cases but they also occur in the mouths of other individuals. He believes that many of these anomalies are genetic in origin.

In conclusion I wish to say that sufficient proof exists now to convince us of the profound influence of the endocrine glands on growth and development. So complicated is the endocrine system that it is sometimes impossible to tell

which gland is the primary cause of some developmental error, as the glands affect each other, and a dysfunction of one is often accompanied by a dysfunction of one or more of the other glands. The surface of this interesting study has hardly been scratched, but we know enough now to prove to us that mouth health and development are affected along with the rest of the body by the secretions of these glands. It is within our province to study and to know more of this subject. You will have to keep a biased mind while reading the literature, however, to prevent being misled and misinformed.

DIET AND THE CHILD'S DENTAL HEALTH

MAX DE LA RUA, ATLANTA, GA.

SINCE the doctor of dental surgery is sought out and looked up to as a leader in the healing arts and in community and personal health, there is no limit to the progress he should be able to make toward the improvement of the child's dental health. Either from the lack of interest or from the lack of knowledge, little attention is shown concerning the influence of diet on the dental apparatus. As well-informed dentists, we should aid our patients in the common-sense selection of the foods they eat. We must impress on them that the foods they eat build the teeth as well as the other parts of the body, and we should make it our duty to advise them about these important health facts.

Strong, healthy bodies and sound, useful teeth have been definitely linked with the proper nutrition of the body. Good health, however, cannot be supported by good foods alone. The child must be free from organic defects and disease. During the growth period both the body and the teeth are affected by the state of nutrition of the body. Since the teeth begin their formation at the start of pregnancy, or more specifically about the sixth fetal week, it is then that the dentist should advise the mother as to the foods which her diet should include. This is especially true, since it has been observed that the vitamins and the other elements comprising the diet have little if any effect on the teeth after their eruption and calcification.

Every diet should be adequate and well balanced. It has been said that "a balanced diet contains an abundance of a variety of clean, wholesome food, not much changed by cooking, is carefully prepared, attractively served, and eaten in the midst of peace and contentment." It must also in every particular provide for maintaining the body in normal health and at the same time support normal growth and development. Unless certain essential foods are supplied in the diet, growth and development suffer, even though the quantity of other food is sufficient. The earlier a child is started on a balanced diet, the better, because after a child has had a one-sided diet, the pull of habit drags him back to his old way of eating. For the child to have an ample diet the dentist must consider the total energy or calorie content, a sufficient vitamin supply, and the necessary mineral content.

In the preparation of the diet the dentist should understand that all foods taken into the body are not assimilated and may only pass through the alimentary canal. If it happens that any portion of the body or the waste matter has a greater affinity for one substance than for another, the food will be drawn there.

Foods in their natural state and not foods of civilization should be included as much as possible in the diet. It has been shown that dental disease almost invariably follows when people consume the refined and artificially prepared

foods of civilization. Where people live on foods indigenous to their locality, they are, as a rule, almost wholly free from dental disease. As far as possible, prescribe foods in their natural state. It might well be remembered that it has never been proved that one type of food is necessary for perfect health and perfect teeth. People all over the world, even though their diets may be entirely different and may not include foods we consider essential, enjoy perfect teeth and good health.

In suggesting the diet consider the total calorie or energy content. A young child, who plays fast and hard all day and who is growing, needs as high a calorie content as his father who sits at a desk all day and requires only 2,500 to 3,000 calories. On the other hand, a child, sickly and weak, who does not play so much, needs a diet which does not supply so much energy but which will build his body and health up to normal.

A diet may contain too many calories and not enough minerals and vitamins to build strong bones and teeth. We must endeavor to maintain a definite balance between the elements of a diet. It has been said that a healthy mother and a well-balanced diet equal a well-balanced baby. Too much of the wrong food is as detrimental to the child as too little of the right food. Few children receiving the proper food overeat, and we can make sure that a child is eating enough if his appetite and weight are normal, or his weight perhaps a few pounds above normal. Parents frequently become worried on receiving notice from the child's school-teacher that their child is underweight. This should not always be considered serious because for some children this is natural, unless it is considered a symptom or is thought of in correlation with a sickly child. We are all prone to minimize heredity or inherited tendencies.

The diet should include the common, simple, natural foods of adult life; for, contrary to popular belief, a child can easily digest and assimilate these valuable foods.

Attention must be given, and properly so, to the vitamins because they influence dental health. Vitamins have been called the protective foods or elements. The dentist should be interested in vitamin A, the anti-infectious vitamin found in butter, fats, egg yolk, etc.; in vitamin C, essential in establishing and maintaining dental health and found in leafy vegetables, fruits, etc.; and in vitamin D, the antirachitic vitamin which influences the intake and deposit of lime and phosphorus in the bones and teeth. Vitamin D is obtained from fish liver, butter, milk, viosterol, sun rays, etc., and can now be taken in the more pleasant forms of tablets, capsules, and concentrated forms. Vitamin D should be given and spoken of in its own right, as a food and not a medicine.

All diet lists should include clean, fresh milk, green leafy vegetables, raw fruits, whole grain bread, butter, liver, and sea food, and at the same time should reduce the amount of white flour, white sugar, and muscle meat. It is obviously impossible for all people to have the above mentioned foods because of their economic situation. For example, a widow with four or five small children could not afford to give a quart of milk a day to each child although a complete diet may demand it. We must attempt to help this group by recommending other good, healthful, wholesome foods.

Frequently, the dentist has the parent come to him complaining that the child is suffering from anorexia, or loss of appetite. Advise the parent to give the child nothing for twenty-four to thirty-six hours except perhaps fruit juices and water to maintain the level of the body fluids. At the end of this time see how the child's appetite has improved from a natural hunger. A child will eat when he is hungry, and a normal child is hungry when mealtime comes if he is not filled with bites taken between meals. Explain to the parent that a child can hardly be expected to eat at the regular meal hour if he has been allowed constantly to nibble candy, cake, and knicknacks, before and between meals. Show parents how unreasonable it is for a child to be expected to eat when he arrives home from school at two for lunch when at school during the 12:30 P.M. recess he had a bottle of milk, a piece of pie, or a candy bar.

If a child has a badly diseased mouth, the dentist should have the parent bring a list of everything the child eats for the following two weeks. The list should include all foods and the quantities eaten at mealtime and between meals. Go carefully over this list, removing everything that has no place in the diet of the child, and adding those things which will improve the child's health and condition. Include a large variety instead of a few articles, and urge the parent to vary the menu constantly. If a food new to the child is included, advise the parent to serve it in small portions until the child develops a taste for it.

Advise the parent to include in the meals a large variety, giving the child what he should have and not what he cries for. See that he has plenty of fresh air, exercise, and sunshine. Tell the parent to serve his meals pleasantly and at the right temperature, giving the child plenty of time to chew the food properly, seeing that he uses both sides of the mouth in mastication. Withhold milk and drinks at mealtime until the food is properly masticated. Conclude the meal with an apple or some fibrous food to aid in cleansing the mouth. The greatest causes for bolting food, constipation, and indigestion are injudicious food habits. Insist that the child chew his food well before swallowing, and observe religiously his habit time.

If a child is given regular, pleasant, appetizing, healthful meals, if he is free from organic defect and diseases, if his diet is well balanced and includes foods in their natural state and those native to his country, if the diet's calorie, vitamin, and mineral content is carefully balanced, if it includes an ample supply of raw vegetables and fresh fruits and has a low sugar content, this diet will be a great help in promoting sound dental health.

REFERENCES

Bunting: Diet and Dental Caries, J. A. D. A., January, 1935.
Ferguson: Diet and Dental Disease, J. A. D. A., March, 1935.
Food Facts, June-July, 1935.
Lucas, Wm. P.: The Health of a Runabout Child, The Macmillan Company.
Babnick, Frank J.: Diet and Its Relation to Children, J. A. D. A. 12: 459, 1925.
Martin, Ethel A.: The Question of Foods, J. A. D. A. 14: 1921, 1927.
Dietetics Applied to Oral Health (Compiled by American Academy of Periodentology), J. A. D. A. 15: 573, 1928.
Fratzke, J. E.: Diet and Children, J. A. D. A. 12: 62, 1925.
Clark, Taliaferro: Nutrition of the School Child, J. A. D. A. 12: 115, 1925.
Rice, C. Hilton, Jr.: Some Feeding Problems of Childhood, J. A. D. A. 12: 747, 1925.
Sansum, W. D.: The Normal Diet, St. Louis, The C. V. Mosby Co.

AN ADDITION TO THE REPORT OF THE COMMITTEE ON EXAMINATION TECHNIC OF THE AMERICAN SOCIETY FOR THE PROMOTION OF DENTISTRY FOR CHILDREN

WALTER T. MCFALL, D.D.S., ATLANTA, GA.

ON PAGES 663-667 of the July issue of the INTERNATIONAL JOURNAL OF ORTHODONTIA AND DENTISTRY FOR CHILDREN there appeared the very interesting report of the Committee on Examination Technic of the American Society for the Promotion of Dentistry for Children. Due to the fact that the illustration did not accompany this report at the time of the publication of the proceedings, it was not possible to show this effective and useful device.

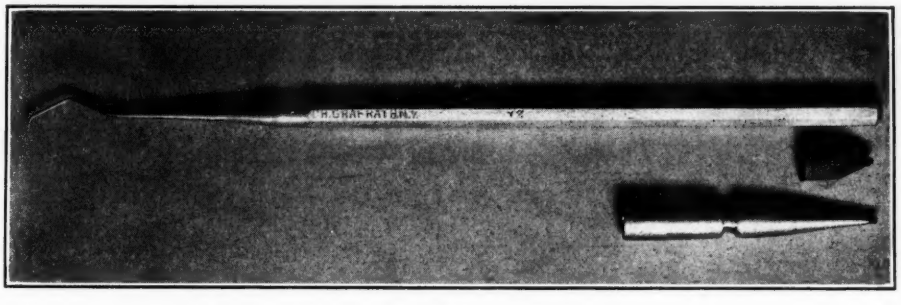


Fig. 1.

On page 665, in the second paragraph, this marking device is mentioned. The accompanying illustration plainly demonstrates the instrument described, which is quickly and easily placed on the shaft end of the explorer.

Dr. Alfred Walker, who served as chairman of the Committee on Examination Technic, is the originator of this simple but most useful marking instrument. Such a device can and will prove itself useful in the dental office and the dental clinic.

ORTHODONTIA—ITS RELATION TO HEALTH AND SOCIETY*

PAUL G. LUDWICK, D.D.S., LINCOLN, NEB.

ORTHODONTICS may be defined as that science which has for its object the prevention and correction of dental and oral anomalies. Basically it must consider, therefore, the etiology of such abnormal conditions, and when manifest, determine by dependable diagnostic methods their nature, location, extent, and degree, and endeavor through suitable means of therapy to restore the affected parts to normal form and function.'' McCoy.

We must realize that orthodontia is not merely a mechanical problem, and that we are not chiefly concerned with the various mechanical methods employed to bring about certain dental corrections. Orthodontia is largely a biologic problem, and we must concern ourselves with a study and knowledge of the problem of growth and development. I do not mean to imply that mechanics has no part in the problem. Almost anyone with any mechanical ability at all could study models of a case of malocclusion and devise some appliance to bring about certain changes, but to direct properly these mechanical forces to bring about a correction is another problem. The simpler the appliance the better, and we should never employ any method of correction which will interfere with normal function. The less banding of teeth the better; the pressure applied should be very delicate; teeth should be guided, not forced, into position.

People are rapidly realizing the advantages of a well-developed and well-arranged set of teeth. Many a boy or girl has been allowed to mature as a dental cripple, and has been forced to occupy a position in life different from what he or she would have, because of certain types of dental irregularities. Parents are realizing their moral obligation to their children and are desirous of providing them with every advantage. What good does the finest education do for a boy if he finds that no one has use for his services because of the distracting influence of his oral deformity? It does not make any difference how talented or graceful the young lady may be, or how beautiful her dress, if her facial features are marred by some dental deformity, no young man is desirous of her company or has any thoughts of matrimony. While esthetics is not all that is accomplished by orthodontic treatment, just the same it seems to be one of the paramount issues of the problem today, and is the thing in a large majority of instances which brings the patients to our offices. No child can expect to grow into a strong healthy adult if he is deprived of a proper functioning occlusion or has a dental deformity which interferes with normal speech or respiration. Many people are considered stupid or weak, and are shunned by others when in reality the deciding factor against them is some unbecoming facial expression caused by a dental deformity. People with receding chins or protruding upper

*Reprinted from the Nebraska State Bulletin for the Promotion of Dentistry for Children.

lips often portray to their acquaintances characters which are not true of them. "Let us conclude then that in addition to the aims and benefits already mentioned, one of the chief objects of orthodontics is to make possible the normal development of the mouth and its correlated structures, so that the child may have imprinted upon its face a personality which is the true expression of its character." McCoy.

We should give careful consideration to each patient who presents for treatment, and after taking study models spend considerable time in studying the case as to probable causative factors, plan of treatment, and probable outcome. After this has been carefully done, we should call in those concerned and go over the plan of treatment, cost, and outcome. Too many times cases have been hurriedly started without careful consideration; the patient and parent are not given a true outline of the case, and dissatisfaction results in a short time. We should not promise our patients things we know we cannot accomplish. We should explain to them that there are so many things which enter into the successful completion of a correction over which we have no control that it is often not possible to accomplish the so-called perfect result. Age of patient, general health, oral health, environment, activity of growth processes, and the type of case figure decisively in the result and must be given careful consideration. Of course, patients are interested in the time consumed in treatment, and I am sure that often in an effort to begin a case we give the patient the impression that the case is rather simple and will not take very long. We must give ourselves ample time for treatment, and it would be better to overestimate the duration of treatment than to underestimate it. I am sure parents would be more likely to boost orthodontia if their child's case was completed in less time than estimated, than if they were required to spend double the time they had planned. I feel sure that those cases which are available for treatment between the ages of seven and ten years will usually take from one and one-half to two and one-half years of active treatment, and the parents will be concerned about the correction until the child is at least twelve years of age, but not all the intervening years will be spent in treatment. It is much better to treat for a while, then place the case on rest, especially the younger patients. If it is a confirmed type of malocclusion, and if the patient is past twelve years of age, probably longer periods of active treatment will be involved, and the periods of rest much less. At any rate, it is advisable to rest the cases and place nature on its own. If our treatment has been correct, and if we have not hurried the case, there will be no relapse, and the case will come out of the periods of rest in a much better condition.

As general practitioners we should be more concerned in the preventive type of orthodontia than in the confirmed type, for in this group lies the real pleasure of orthodontics. The older patients with the confirmed types of malocclusion present many problems which may lead to difficulties and should be left to those whose knowledge of the subject makes them better fitted to undertake the treatment. Between the ages of seven and ten years is the best time for corrective work. The patients are young, and nature is more desirous of a change, for the children are entering upon the period of most active dental development. The root development of the permanent teeth present is only partially completed,

and any change made in their position will be made more secure in their new location by the completion of the root development. Deciduous teeth are being lost, and new permanent teeth are erupting; these new teeth can be guided to their proper position with greater ease. The features of the face have not yet been distorted by the malposition of teeth or by jaw deformity, and as a result facial deformities can be prevented. If there exists a malrelation of the jaws, one to the other, as is true in a protruding mandible or maxilla, we can be more assured of reestablishing normal jaw relationship during this developmental period than later.

Before beginning treatment, we should have as complete a history of the case as possible, including information concerning the child's habits, hereditary manifestations, oral health, conditions of the nose and throat, height and weight, together with full x-ray examination and photographs of the patient. With these reports and other information before us we can take our models, study the case carefully, construct appliances, and begin treatment. Without this foundation, we wander about in our treatment, hoping nature will be kind enough to carry us through; and, if we have a failure, we wonder what is the cause.

There are several methods by which we may predetermine the arch, classify the patient according to racial type, and plan an arch which would be satisfactory to that particular patient. The same general contour of an arch for a tall slender girl would never do in the stubby, round-faced boy. Orthodontic treatment consists of more than just the construction of appliances. We should have a definite knowledge of the case at hand and a plan of what we are about to do.

In the treatment of malocclusion we should keep in mind that bone building and bone absorption take place faster than does the rebuilding of muscle tissue or nerve and blood supply. The power applied in excess of the possibilities of the orthopedic movement is detrimental. There are four things to keep in mind: bone, muscle, nerve, and blood supply. We should be cautious so to regulate the force that the normal function and the healthful condition of the teeth and surrounding tissues are preserved. Nature will permit their movement only as rapidly as she is able to take care of the broken down tissue caused by pressure of the teeth against the alveolus, and to build new tissue in its place.

We must not ignore the importance of careful prophylaxis throughout orthodontic treatment. If we have obtained a fine result according to arrangement but have been instrumental in causing a disturbance of the teeth and oral tissues, we have not bettered the condition in the least. The mouth should be placed in fine repair before orthodontic treatment is attempted, and then at each subsequent visit the appliances should be removed, the teeth carefully cleaned, and the appliances adjusted and replaced. About once every four or five months the anchor bands should be removed, and the teeth polished before they are replaced. A careful examination by the attending dentist every five or six months is important in order to check any small decay which may occur.

It is important, of course, to see that patients have a well-balanced diet, which should consist of plenty of fresh fruits, green vegetables, and milk. The

use of cod liver oil during treatment is advisable, too. If for any reason we feel that the patient presents any diet problem, we should seek the advice of the attending physician and not assume this responsibility.

To obtain an improvement in tone of certain muscles as an aid in orthodontic treatment, exercises have been devised to bring this about.

The first important exercise is forced breathing, raising the cartilages of the alae instead of depressing them as is usually done. This allows a full passage of air and tends to raise that portion of the face about the end of the nose. This also favors the full development of the maxillary sinuses, which also have a direct bearing upon the development of the maxilla.

Chewing with the lips closed, opening the jaws wide each time, thus pulling the upper lip down, develops the obicularis oris. Closing the lips and moving them in a rolling motion also aids greatly in the development of the muscles in this region.

When a deficiency of bone growth exists about the root portions of the teeth in either the mandible or the maxilla, muscle activity and bone growth can be stimulated by closing the lips and blowing hard, directing the force in the desired location. This is a very fine and important exercise and can be used to good advantage in the development of facial expressions.

Since orthodontia deals with abnormality of the arches, I have attempted to show that without the harmonious functioning of all the associated parts, we cannot hope to gain a successful result.

It would not be proper in any discussion of orthodontia to fail to mention the importance of the space maintainer. There is no greater service which we can render our young patients than to advise the maintaining of the space created by the early loss of a deciduous tooth. Many types of these maintainers have been advised, but probably the one best adapted is that one which has the loop wire attached to the anchor band, which allows space for the tooth to erupt without being interfered with. This can be worn until the tooth is fairly well erupted before being removed, while the bar type sometimes interferes or deflects the eruption of the new tooth. A large percentage of cases of confirmed malocclusion could be prevented through the use of a space maintainer, and if we are to render a real service to our patients we must not overlook its use.

While it is not my intent to enter into a discussion of appliances, I might offer some helpful hints in appliance construction. The first thing to do after having carefully planned the appliance is to construct suitable anchor bands which are well fitted and adapted. After these have been fitted, it is well to take an impression with the bands in place, and then pour a working model which has the anchor bands on it. From the model then, the arch can be constructed. If the appliance is to be a lingual type, the bands are made secure in the model, first having added the lingual attachments; and if the appliance is to be a labial type, it is best to have the bands so they can be removed. This can be done by waxing the inside before pouring the model. The buccal tubes and lingual spurs can then be added, and adapted to their proper positions. The simpler the appliance the better. There are, of course, many types of appliances on the market for which many claims are made, but in the hands of most

men the labial appliance is most satisfactory. With this appliance the various corrections are clearer and more direct. For very young patients and where the correction consists mainly of expansion, the lingual type can be used, for the adjustment is rather simple; but in the confirmed cases it is rather difficult to adjust, and it is better to use a type of appliance with which we would not be so liable to get into difficulty.

Appliances should be changed from time to time so as to be adapted better to do the thing at hand. Care should be exercised in the fitting of the appliances so that at no time do they interfere with normal function. Much difficulty could be spared the operator and discomfort spared the patient if the appliances were kept well adapted, and an appliance was not used longer than to overcome the correction for which it was designed.

In closing I should like to offer some helpful hints to keep in mind when examining children or when confronted with an orthodontic problem.

1. Watch for and stress the importance of the first permanent molar. It is the key tooth to proper occlusion.

2. Until the age of three years, it is usual to find all the deciduous teeth in normal alignment

3. Between the ages of three and six years, spaces should appear between the anterior teeth. This denotes development or preparation on the part of nature to accommodate the permanent teeth which are soon to erupt.

4. When this spacing is not present or is insufficient, a crowded condition is certain to result.

5. A case of unequal development of the arches may occur, the mandible may be displaced mesially or distally to the maxilla. This condition is the forerunner to the so-called Class II or Class III cases. The condition may also follow the drifting of teeth from the early loss of approximating teeth.

6. In cases of narrowed arches, the maxillary and mandibular central incisors usually complete their eruption in a normal position, but at the expense of deciduous lateral incisors, which are absorbed early as a result of the pressure. The central incisors drift as a result, and the permanent lateral incisors are crowded out.

7. The deciduous canines are absorbed early as a result of eruption of lateral incisors, which move into their position, or if not remain either labial or lingual to their normal position.

8. Then four permanent teeth occupy the space of the six, and a flattened narrowed arch results.

9. Most patients presenting themselves for orthodontic treatment do so for purely cosmetic reasons; they object to the malposed position of one or two teeth.

10. In order to move teeth, space must be provided, and this in turn means additional growth or expansion of the entire arch.

11. Permanent results require symmetry of both arches, one being dependent upon the other.

12. Maintain all spaces resulting from the early loss of a deciduous or permanent tooth. This is a very valuable service which every dentist can render his patients.

13. The corrective procedure on young patients is much more permanent and easy; while in older patients the corrections are much more difficult.

14. The developmental age presents the best period for undertaking orthodontic treatment; this is between the ages of seven and ten years when advantage can be taken of nature's own desire for development.

15. Watch for irregularities, and begin treatment early.

16. It is not always possible to obtain the so-called perfect result. If we have made an improvement as far as function is concerned, have left the mouth in a healthy condition and produced a result which is pleasing, we feel that the patient and the dentist have been well rewarded for their efforts. Often there is harmony in a little irregularity.

The discussion of the various types of cases and their treatment are subjects of their own. Every case presents a different problem, and I have tried to discuss only those things which might be of interest in a general way.

In closing, let me quote from Dr. Guy Milbury: "Above all, happiness is greater than wealth, and it does not exist in ill health. If we were to accomplish nothing more than to make people happy, we have worked toward a worthy cause. Our greatest hope lies with the child."

SURGICAL CONSIDERATIONS IN THE CHILD'S MOUTH*

FERDINAND GRIESS, D.D.S., LINCOLN, NEB.

THE infant is born into the world without any thoughts or inhibitions on any subject. He is equipped with a human organism and probably with a few primitive natural instincts. He has no inherited consciousness nor instinctive feeling of fear. It is only as the child grows older, with the environment and training surrounding him, that shyness and fear appear, and no matter how fine the training there are doubtless circumstances in which anyone will ignore restraints and follow his natural emotions.

Is it not true that any normal person would most likely steal before he would starve, certainly before he would let a member of his family suffer?

So it is instinctively with the normal mother. Unconsciously she is liable to instill fear in the child when the opposite emotion is most desired. Then how often has a child had an encounter with the physician before he ever sees a dentist? These are some of the points of which we must think when we first see the child for dental surgery.

I believe that the roentgenogram is just as important for the child as for the adult, and it accomplishes two things. We all know that we must have the child's confidence, and there is no easier way to obtain it. The taking of a roentgenogram is without pain, and immediately the child is inspired with more confidence. Also it tells you what you are looking for, and frequently more.

Recently I have seen a child, nine years of age, with a follicular cyst in the mandible after the extraction of a deciduous molar. The cyst had reached the size of a small walnut at the expense of the jaw bone, the permanent second premolar, and the first permanent molar. Both molar and premolar had to be removed, and the child had to refrain from taking solid food for some time. Since the cyst had destroyed a good portion of the jaw bone, a postoperative fracture was not impossible.

Another case was that of a young man, in his twenties, with deciduous roots left on the mesial and distal side of the premolar with dense bone surrounding them, so that it meant a risk of at least one tooth in attempting to remove these roots.

Such cases occur frequently—when the deciduous tooth seems normal and is ready to exfoliate, why take a chance when it is so easy to make a radiograph?

Preoperative consideration should be kept in mind as well for children as for grown-ups, since some children have diabetes, heart lesions, and a tendency to bleeding, also an enlarged thymus gland. Any of these types of children are a poor risk, and the advice of their physician should be sought.

*Reprinted from the Nebraska State Bulletin for the Promotion of Dentistry for Children.

The judgment of both physician and dentist should decide as to the extent of surgical procedure, proper medication, type of anesthetic, and the possible need of hospitalization, since most of these cases are a poor risk in the average dental office. We must also remember that preoperative care in acute and subacute infections is highly important.

The solution for a local anesthetic should never be injected into an acutely infected area. Either establish drainage through the tooth or, if it has reached the stage of subperiosteal abscess, incise and drain. After drainage is established, the mouth should be kept clean by the frequent use of a suitable mouth wash. I prefer a 50 per cent solution of hot detoxol.

Unhygienic mouths never respond so well after an extraction as do clean ones. Wherever possible, a prophylaxis and a series of treatments should be carried out, such as cleaning the mouth three times daily with a suitable antiseptic mouth wash.

If possible, avoid operating on a child who has a cold, and never operate on a patient who has a sore throat, fever, or digestive disturbances.

Premedication on the average child is not necessary, although in some cases it is highly desirable. This is especially true if the operation is of long duration or if a general anesthetic is chosen. Should the operation be of short duration, novocaine without epinephrine is the solution of choice.

The operator in all cases must inspire confidence and should be both kind and sympathetic, yet firm. The presence of relatives or friends in the operating room is usually a disturbing factor. Deception should never be practiced on children. Unnecessary display of surgical instruments to the child should be avoided. The less the patient sees, the better it will be. All preparation should be made before the child enters or sees the operating room.

Alcoholic stimulants should never be employed on children; it is better to use the bracing effects of aromatic spirits of ammonia.

Use as sharp and slender needles as are safe in your technic, and thus avoid discomfort in the initial steps of inducing anesthesia. Usually the 25 gauge needle is the one of choice. Always inject the solution slowly.

It is always dangerous to give a general anesthetic to a child with an enlarged thymus. The thymus is a two-lobed body in the neck and thorax of an infant. It appears to be a true lymph gland and to have a hematopoietic function. It begins to waste away about the second year and disappears about the end of the thirteenth year.

Good operative technic is essential in all surgical operations. The field of operation should be walled off with cotton rolls or gauze packs to keep the flow of saliva from entering the wound. All tissues should be inspected, as a good blood supply to the part is the best assurance of tissue repair. High content of epinephrine in the anesthetic solution will cause an insufficient blood supply to the part for some time after the operation.

Asepsis should be the keynote with every dentist. Everything coming in contact with the operation should be carefully sterilized, including towels, dressings, and instruments. The hands should be thoroughly scrubbed and dipped in

a solution of metaphen or mercuric chloride, and if possible rubber gloves will always add to the asepsis of the operation as well as give protection to the operator.

The child's throat should always be packed. A tooth sometimes will easily leave the forceps and may reach the bronchial tube.

Many complications are prevented by good postoperative care, both local and general. Especially is this true of children who have no resistance, such as anemic, undernourished, and tuberculous little patients.

After the extraction, the child should eat easily digested foods and partake of a large amount of fruit juices. If the latter are not available, have him drink considerable water. By all means, impress upon the mother that the child's bowels must be kept open. A mild cathartic may be used, such as petrol-agar—one teaspoon, cascara—one-half to one teaspoon, or milk of magnesia—one-fourth to one-half ounce. Any of these will suffice in the average case, although in a few cases more drastic cathartics may have to be used.

There should be no washing or cleansing of the mouth for the first twenty-four to forty-eight hours. The child should be seen the third day after the operation and at intervals thereafter if necessary.

If there is no rise in temperature, you may almost rest assured that there will be no complications. The patient is then instructed to irrigate his mouth with a mild antiseptic solution or a normal saline solution. Do not allow the use of hydrogen peroxide.

Because of the activity of the child, hemorrhage after extraction is not infrequent. This should be given immediate attention. The clots should be wiped out with a sterile piece of gauze or syringed with warm water. A pressure pack of sterile gauze is often sufficient to control a small hemorrhage; if not, administer fibrogen, ceanothyn, or calcium lactate, and keep the child quiet.

Both heat and cold may be used to relieve pain and swelling. In the early stages of infection apply cold, as lowering of the temperature of the part prevents extravasation of the elements of the blood and thus reduces and frequently prevents incipient infections. If the infection is extensive, heat by means of compresses is applied. This brings about hyperemia, thereby increasing the number of leucocytes, and hastens the walling off and localizing of the infection so that it may be incised and drained.

Dentists should make it a rule not to extract for a child who is ill and whose resistance is low. An attempt should be made to build up such an individual before doing any dental surgery.

I have a case in mind, a child ten years of age, who had been treated at a city clinic with bismuth injections intramuscularly. This child was undernourished, was not up to par as to growth or weight, and had a neglected mouth and an acute stomatitis. We attempted to clean up the case at the University Clinic by placing the child on a corrective diet and by carrying out prophylaxis of the mouth. While some results were obtained, the mouth invariably relapsed into the bad condition. We absolutely would not attempt any surgery on this child during this time but insisted on a thorough medical exam-

ination. This was done, and it was found that the child had tuberculosis. Since the child has been under treatment for tuberculosis, there is a marked improvement in the mouth condition.

Extensive infection with marked boardlike cellulitis so often occurring at and below the angle of the jaw, complicated by trismus, with a temperature from 102° to 104° definitely contraindicates extraction at the time. Hot moist dressings should be applied until the pus has localized. The pus should be promptly drained, and continued evacuation should be provided for with a drain.

Should there be a sudden drop in temperature not accompanied by a like drop in pulse rate, localization of pus may be expected.

A CLASSIFICATION OF DENTAL CARIES AND ITS RELATION TO PULPLESS TEETH*

CHARLES F. BÖDECKER,† D.D.S., F.A.C.D., NEW YORK, N. Y.

CHART I

TYPES OF DENTAL CARIES

	ACUTE	CHRONIC	SENILE
Frequency	Exceedingly common.	Fairly common.	Not common.
Age at which most active	During childhood and up. Fifteen to twenty-five years.	After twenty to thirty years.	After fifty years.
Distribution	Chiefly in crowns of teeth at areas of food stagnation. In highly rampant cases also on free surfaces.	Usually in crowns, but also in roots if these areas are accessible through detachment of gingiva.	Principally in roots; the crowns often have few or no fillings and are now more nearly immune to caries.
Form of Cavity			
Occlusal surfaces	Show very small orifice of cavity, slight destruction of enamel; deep penetration.	Show wider orifice, greater enamel destruction, shallow penetration.	Do not occur.
Approximal surfaces	Show somewhat wider orifice of cavity but deep penetration.	Show extreme surface destruction, shallow penetration.	Rarely occur.
Root surfaces	Have not been observed to show acute caries.	Show extensive but shallow lesion.	Show small orifice and very deep penetration, usually in secluded areas at the cervices of the teeth.
Dentine			
Rapidity of progress	Rapid penetration, often with pulp involvement.	Slow penetration, pulp involvement more rare.	Fairly rapid penetration; pulp involvement frequent.
Sensitivity to instruments	Very great.	Slight.	Moderate.
Thickness of decalcified zone	Considerable.	Very slight.	Moderate.
Character and color of carious dentine	Soft cartilage-like; a yellowish-white color; easily removed with spoon excavators.	Less soft; of a dark yellow, brown or black color.	Soft, leathery; of a brownish color.
Enamel			
Extent of partial decalcification	Great; very friable and easily removed.	Slight.	Rarely occurs.
Configuration of cavity walls	Extensive overhanging walls.	Slight, if any, overhanging walls.	

*Issued by American Society for the Promotion of Children's Dentistry.

†From the Research Laboratory of Oral Histo-Pathology, Columbia University Dental School.

CHART II

VARIATIONS IN THE REACTION OF THE TEETH TO DENTAL CARIES OF INDIVIDUALS OF DIFFERENT AGES, DEPENDING UPON THE PRESENCE OR ABSENCE OF THE PULP

IN CHILDREN

Vital Teeth	*Pulpless Teeth*
	(Pulp removed shortly after eruption of tooth)
(1) Have highly permeable, open channels filled with lymph, necessary for post-eruptive calcification of dentine and enamel.	(2) Are almost impermeable; tubules contain no lymph and are filled with gaseous-fatty casts as a result of metamorphosis of dentinal fibrils.
(3) Abnormal pulp or deranged systemic conditions, most common in youth, change character and quantity of dental lymph, which probably results in a reduced buffer power of the dental tissues.	(4) Pulp being absent, interior decalcification cannot occur.
(5) Posteruptive calcification is incomplete; dental tissues are highly permeable.	(6) Posteruptive calcification is incomplete; nevertheless the tissues are almost impermeable, as noted under No. 2.
(7) Above conditions result in a rapid, deep penetration of dental caries.	(8) Caries, even if active in the mouth, cannot penetrate impermeable dentinal tubules, but must pass through the matrix. Hence only a very slow surface destruction can occur. Abrasion is rapid, as posteruptive calcification is incomplete; fractures are common; absence of lymph results in a dry and brittle tissue.

IN ADULTS (AFTER TWENTY-FIVE YEARS OF AGE)

Vital Teeth	*Pulpless Teeth*
	(Pulp removed ten or more years after eruption of tooth)
(9) Are less permeable, as pulp has receded slightly with the formation of secondary dentine in the crown. Secretion of lymph is reduced.	(10) Are almost impermeable, as noted under No. 2.
(11) Posteruptive calcification has been completed.	(12) Posteruptive calcification has been completed.
(13) As a result of the above conditions, caries does not penetrate as rapidly as in children; is more superficial and sometimes comes to a standstill.	(14) Caries is inactive, as noted under No. 8. Abrasion is no more rapid than in vital teeth, but liability to fracture is still imminent.

IN OLDER ADULTS

Vital Teeth	*Pulpless Teeth*
(15) Show greatly reduced permeability as conditions noted under No. 9 progress.	(16) Are almost impermeable, as noted under No. 2.
(17) Crown dentine and enamel are usually entirely cut off from the pulp by secondary dentine. Crowns are therefore probably safe from true dental caries (acute). Pulp is still active in the root. Dental caries may occur in this area, dependent upon the denudation of the root and pulpal abnormality or systemic derangement. These conditions result in deep penetrating caries (senile), quickly involving the pulp.	(18) True caries cannot penetrate even if the root is exposed by a recession of the gingiva. Hence only a very slow surface destruction can occur. Fracture is still imminent.

THE TREATMENT OF EXPOSED PULPS IN DECIDUOUS TEETH AND OF ABSCESSED DECIDUOUS TEETH*

THOMAS A. GARDNER, D.D.S., OMAHA, NEB.

ONE of the chief problems confronting the dentist in caring for the child patient is the exposed pulp in deciduous teeth. Such teeth may be disposed of in several ways:

(1) By extraction; (2) by doing nothing; (3) by capping the pulp; (4) by amputation of pulp.

An attempt will be made here to discuss the above possible methods of treatment.

Extraction.—Those who do not favor pulpless teeth in any form will extract deciduous teeth with exposed pulps. In the light, however, of what has been done in many clinics for children as well as by many dentists who do children's dentistry, extraction is a radical treatment. Later in this paper I shall offer what is considered a successful treatment. If possible, the offending tooth should remain in the arch for mastication, jaw development, and arch integrity. It is true that if the tooth is extracted a space maintainer may be placed to prevent the collapse of the arch. If a natural tooth can be retained, however, there is nothing superior. Extraction is recommended only for those cases in which the medical history is unsatisfactory.

Doing Nothing.—It is strongly suspected that this course of treatment or, rather, neglect, is most frequently pursued, possibly because many dentists are at a loss as to what to do. Such teeth will abscess within a short time, and this generally means an aching tooth and a physical upset for the child. Extraction follows, or the tooth remains a source of infection, a cache for food and bacteria to infect the tonsils and blood stream and to lower the child's systemic resistance to disease. This type of treatment, therefore, should not be employed.

Pulp Capping.—No one has ever presented scientific evidence in the dental literature to show that pulps of deciduous teeth can be successfully capped. It is evident that the deciduous pulp is a different type from that found in the permanent teeth. Do not attempt pulp capping in deciduous teeth, for failure will occur in most cases.

Amputation of Pulps.—Pulp amputation in deciduous molars has been successfully practiced for many years by a sufficient number of dentists to prove its merits. Of the various possibilities for handling exposed pulps, amputation offers more advantages than any other method. Teeth so treated will remain in place to perform all essential physiologic functions and will exfoliate in a

*Reprinted from the Nebraska State Bulletin for the Promotion of Dentistry for Children.

wholly normal manner. (Abscessed teeth will not exfoliate normally.) The natural tooth is superior to a space maintainer, which may be "off and on again" before the time for eruption of the permanent successor.

Pulp amputations are recommended if not less than one-third of the roots are absorbed. The rate of absorption will vary with patients of the same age; therefore the x-ray picture is the best guide. As a rule, pulp amputations may be done up to ten or ten and one-half years of age for the second deciduous molar and about nine or ten years for the first deciduous molar. Pulp amputations should not be done for children with unfavorable medical history.

Several technics are available for amputating pulps: (1) block or infiltration anesthesia; (2) pressure anesthesia; (3) desensitizing medicaments.

Block or Infiltration Anesthesia.—This method offers the best chance for success. The patient, however, may be so young or uncooperative as to make it inadvisable. While awaiting anesthesia, the cavity may be excavated of all caries or other work may be done. A rubber dam should be placed. Some operators are successful in employing cotton rolls. When the anesthetic has taken effect, the roof of the pulp chamber may be removed and the pulp amputated at the openings into the root canals. A large round bur is used for this purpose. It may be sterilized by dipping into formocresol. Hemorrhage may be controlled by the application of formocresol for about two or three minutes. The pulp stumps must be thoroughly cauterized, and no blood clot whatsoever must be permitted to remain. If this is accomplished, it is feasible to fill the pulp chamber at this sitting. A paste made of zinc oxide and beechwood creosote with a trace of formocresol is satisfactory. Gently settle the paste onto the stumps and cover with cement. After several days, if no tenderness or pain has developed, the permanent filling may be inserted. Check from time to time with an x-ray picture.

Pressure Anesthesia.—This technic is used successfully by some operators. A novocaine tablet is dissolved in several drops of phenated peppermint water and applied to the pulp exposure on a cotton pellet. Pressure is brought to bear gradually by means of unvulcanized rubber and a blunt instrument. Finally a quick, powerful pressure is used which anesthetizes the pulp. The balance of the technic is as described above. This method has the disadvantage of causing considerable pain and also has the possibility of forcing infection beyond the apex.

Desensitizing Medicaments.—Discs for this purpose usually have some arsenic in them which, undoubtedly, more or less injures the pulp tissue remaining in the canals. Under the first two technics this will not happen. It is the experience of many men, however, that this technic seems satisfactory in spite of the theoretical consideration.

I use novo-desensitizing discs. Each disc contains one-fiftieth grain of arsenic and one-fiftieth grain of novocaine. Depending upon the size of the tooth and the cavity opening one-fourth to one-half of a disc is used; hence only one two-hundredths to one-hundredth grain of arsenic is the usual amount used. Because of this small dosage a positive exposure must be present in order for

the medicament to be effective. The disc is dipped in eugenol and carried to the cavity. Treatment cement or stopping is used to seal the cavity. A tight gingival seal is necessary because of the nature of the medicament. Pain may arise several hours later for an hour or less. The disc must not be permitted to remain in the tooth more than twenty-four hours.

At the next sitting, before entering the pulp chamber with a bur, test the pulp for sensation. If the pulp has been in a condition of hyperemia prior to the insertion of the desensitizing disc, the medicament will not be very effective. For such cases the pulp should be dressed with eugenol for several days. If the pulp has no sensation after treatment, it may be amputated at once following the technic as given under the first two methods with the exception that the protective paste is not inserted at this time. If the tooth has ever ached or if there is any suspicion that the pulp may have been partially abscessed, a treatment of formocresol should be sealed in for several days; if not, then a dressing of phenol compound. After this, dress the pulp with the usual paste, and insert the permanent filling.

PUTRESCENT OR ABSCESSED DECIDUOUS MOLARS

Usually the best treatment for the abscessed tooth is extraction. There are, however, indications for treatment of such teeth. If the tooth is a second deciduous molar, if the first permanent molar has not yet erupted, and if the tooth is apparently not too badly involved, an attempt may be made to preserve the tooth temporarily until the first permanent molar has erupted, after which the tooth in question may be extracted and a space maintainer placed.

Formocresol should be applied three or four times at intervals of two days. If the dressing is "sweet" at the end of the period, the pulp chamber may be filled with the paste previously recommended above.

AN APPEAL BY THE HYGIENE COMMISSION OF THE F.D.I.

THE dentist who surveys the scientific investigations in the past half century cannot doubt that the health of the permanent denture is influenced not only by hereditary factors and by nutrition, but also very materially by the state of the deciduous denture. The formation, the dimension, and the shape of the jaws and the position of the teeth and their occlusion, as well as dental caries—and in some respect also, paradentosis—prove to be in a causal relation with the fate of the deciduous denture. One has only to indicate some well-known items menacing the denture:

1. The bad habits of infants that deform the alveolar processes and the bones of the jaw.

2. Imperfect mastication, which causes the shape and the bony structure of the jaws and also the masticatory muscles and the salivary glands to lack functional stimulation and consequently not to develop normally and vigorously, while at the same time the automatic cleansing by food friction is absent.

3. Soft, sticky food, containing excessive sugar, causing caries.

4. Insufficient care and cleansing.

Factors 2 and 3 form a vicious circle; the decayed molars are painful and so prevent a vigorous mastication, and the habit of imperfect mastication results in an absence of automatic cleansing and so favors caries. The first permanent molars decay quickly under these circumstances; their position also is upset by the decay and the loss of the deciduous molars. Not only a permanently faulty occlusion, but also an abnormal position of the premolars or the canines, and other lasting anomalies, are the consequences of caries of the deciduous molars. Moreover, there arise apparently insignificant inclinations of the axis or slight vertical displacements of the premolars, which cause stagnation areas near the contact point or next to the interdental papilla, foreshadowing future caries. One does not exaggerate by asserting that caries of the premolars and molars can be imputed to the conditions of the deciduous denture just described.

The school dentist sees the children's dentures some years too late, without being able to obviate the calamitous result. The imperfect development of the jaws, of the masticatory muscles, and of the salivary glands—the consequences of the lack of mastication—can never be entirely remedied after the sixth year. The deciduous molars, presenting themselves to the school dentist with inflamed pulps, abscesses, broken down crowns, cannot be restored; the mesial displacement of the first permanent molars, which is so fatal for the position of all the anterior teeth, can be prevented only by retention appliances.

All this is well known to dentists: that only control in due time of the deciduous denture, with an urgent instruction as to bad habits, efficient mastication, rational food, and careful cleansing, and finally the early treatment of

the deciduous molars, these measures alone can—not absolutely but in the majority of instances—prevent malocclusion and caries in the permanent denture, and can diminish the predisposition to paradentosis.

It is the duty of the profession to do everything that can conduce to this end; here really is the basis of preventive dentistry.

This ideal cannot altogether be attained at the present time on account of the ignorance and the indifference of the public, of educated people also, and even of the medical profession. To improve this state of affairs, we must present *convincing evidence.* The Hygiene Commission of the Federation Dentaire Internationale is convinced that we put forward our strongest argument when we show the destroyed deciduous molars at the time the child enters the school, a statement that can be easily proved by statistics. In order to procure these, the Hygiene Commission of the Federation Dentaire Internationale asks you to cooperate. Its aim is to collect from different countries statistics that indicate the *status praesens* of children's dentures when they enter school, further to tabulate the results, to state the conclusions, and to broadcast them to the public.

In this way the commission hopes to stimulate authorities and other interested parties to establish preschool dental service, and by attaining this to reach the only effective method of prevention of the most universal disease of mankind.

For many years and in many countries records of the state of the deciduous denture of children entering school have been kept by the school dentists, who have tabulated the results and have published them in the languages of their countries. The Hygiene Commission of the Federation Dentaire Internationale invites you to collect such statistics and to forward them to its secretary or to indicate to him the papers wherein they can be found. If they also give information as to the race, the food, the mode of life, and the care of the teeth, these statistics may perhaps help to solve the problem of caries, its predisposition, and its prophylaxis. But, if in the dental press of your country no statistics about this matter have been published, the commission would be extremely obliged to you if you would ask the school dentists in your district to furnish them. *What is chiefly wanted is the state and the degree of carious decay of the deciduous molars and the principal anomalies of the jaw bones and of the occlusion at the age of six or seven years, especially the mesial displacement of the first permanent molars.*

We urge you to support this inquiry, also to forward to us the names of colleagues in your country eventually willing to participate in this comparatively simple and yet important task.

Please send any information, data, or record of findings to the Hygiene Commission of the F.D.I., The Hague, 99 Joh van Oldenbarneveltlaan.

ORTHODONTIA AND DENTISTRY FOR CHILDREN*

FRANK A. DELABARRE, D.D.S., M.D., BOSTON, MASS.

ON THE assumption that dentistry for children is essentially a health service and that it cannot be completely effective without attention to the functional handicap resulting from malocclusion, the question of responsibility for giving that service arises.

The occurrence of malocclusion in young people is variously estimated from 60 to 80 per cent or more.

It is frequently found in its incipient stage in very young children, and its tendency is to grow progressively worse through the forces of malfunction.

Rational diagnosis and prognosis (the determination of the advisability of correction of malocclusion at an early age) are difficult, and rest on the decision as to whether or not the malrelation is basic in character and correctable.

It presumes a knowledge of the trend of growth and development as related to physiologic age, from the deciduous, through the mixed, to the very different adult dentition, each presenting a constantly changing relationship, not only of the teeth but also of the supporting structures of the face and skull.

The so-called "norm" of adult life is not fixed, but is variable, within fairly definite limits of accepted attributes. The norm at any previous age is likewise variable, but it is also a constantly changing standard, due to the growth and development of the parts and the addition to the number and form of the teeth.

Science tells us that function determines form. Applying that to malocclusion, function must be interpreted in the broadest sense to include all the functions of the body, since they are all concerned in growth and development in varying degrees of influence according to their physical and physiologic relationships. A wholly efficient function therefore results in the form most desirable for the organism. Conversely a poorly functioning unit will have a less desirable form. Therefore malocclusion must be the end-result of malfunction. This explains the tendency to progressive changes found in grossly complicated cases later in life.

Early departures from the accepted standards of growth and development appropriate to the age are usually small in degree and may be overlooked or minimized if we lose sight of the threat to function when their character is basic in nature.

The correction of malocclusion is easiest when undertaken before the function is seriously disturbed by the added complications that inevitably come in neglected, positive cases.

*Reprinted from the Review of Dentistry for Children, July, 1935.

This is a strong and compelling argument for early correction, but its justification lies wholly in a diagnosis founded upon the principles briefly outlined above.

One illustration of all this must suffice in this short article. Lack of lateral width growth is the most constant attribute of malocclusion. It has been amply demonstrated that growth in this direction in the deciduous molar zone is completed before the eruption of the successors.

Because of this, adequate growth should be stimulated through orthodontia before the root absorption of those molars has proceeded to the point that any applied pressure would result only in tipping those teeth instead of the resultant lateral growth of the alveolus which is desired. If delayed beyond this period it cannot be gained in this zone until the premolar roots themselves have grown enough to influence the supporting structure. In other words, between the approximate ages of nine and thirteen years, lateral growth cannot be successfully acquired in this zone.

It has taken orthodontia nearly thirty years to lay the foundation of scientific and clinical evidence to justify its present-day procedure, emphasizing diagnosis and minimizing the mechanistic approach. Meanwhile, appliances have been refined and elaborated to an extent that we could still carry on effectively without further improvement. We do need, however, a vast amount of further study in all the related sciences to give us a more complete understanding of the mysteries of growth and development.

The undergraduate curricula are not yet adjusted to equip the student to practice orthodontia successfully. Existing postgraduate schools are handicapped in giving sufficient clinical experience by the shortness of their courses.

It is only by intensive study and a wide experience in practice that the present leaders in the field have established themselves as such. There is no branch of the profession that has shown a wider interest in pure science related to the problem than has orthodontia.

With a full recognition of our own limitations and a very modest statement of our progress and present ability, coupled with an intense interest in the health and well-being of the child, it is urged that the dentist serving the child should not attempt the correction of malocclusion without the necessary foundation of knowledge required for a competent diagnosis and a familiarity with the mechanical aspects essential to treatment.

As a group and individually, orthodontists endorse and commend most fully the dentist's objective. The dentist's aid is needed to lessen the incidence of malocclusion arising from the all too prevalent neglect of oral health. In like degree dentistry needs the cooperation of orthodontia to the end that the child may not be handicapped by a mouth crippled by malocclusion.

Department of Orthodontic Abstracts and Reviews

Edited by
DR. EGON NEUSTADT AND DR. JOSEPH D. EBY, NEW YORK CITY

All communications concerning further information about abstracted material and the acceptance of articles or books for consideration in this department should be addressed to Dr. Egon Neustadt, 133 East Fifty-Eighth Street, New York City.

The Influence of Orthodontic Movement of Deciduous Teeth Upon the Germs of the Permanent Teeth. Abstracted from "Über die Beeinflussung der Zahnkeime durch orthodontische Bewegung der Milchzähne" by C. Breitner and M. Tischler, Ztschr. f. Stomatol., December, 1934.

The value of orthodontic treatment of the deciduous teeth is evidently dependent upon whether or not such treatment can improve the condition of the permanent teeth. This question may be answered through roentgenographic or

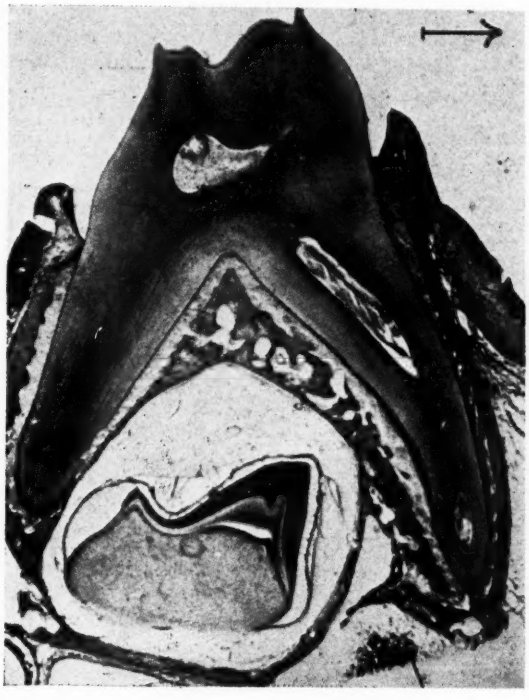


Fig. 1.—Deciduous molar with premolar germ lying between its roots, being moved in direction of arrow (buccally).

through histologic examination. The histologic method was preferred because a comparative examination of roentgenograms opens the way to many possible errors.

BUCCAL MOVEMENT

The first experiment was conducted on a two-year-old monkey. Bands were placed on canines and deciduous molars on both sides, the bands soldered

together and connected across the palate with a screw arrangement. The appliances were adjusted twice within fourteen days, and then the animal was killed.

Fig. 1 demonstrates the condition present in the first experiment. The germ of a premolar lies between the two roots of a deciduous molar, which was moved

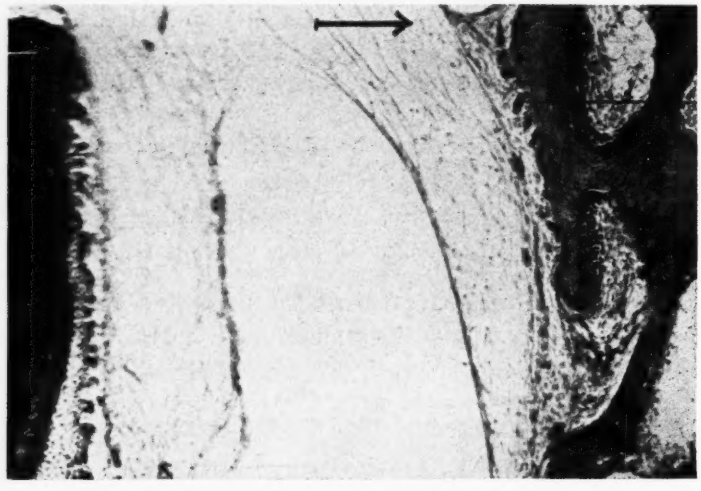


Fig. 2.— High magnification of premolar germ with bone trabeculae on its buccal side; *Sch*, enamel of germ; *Sch E*, enamel epithelium; *Ok*, osteoclasts resorbing the bone trabeculae. Movement in direction of arrow.

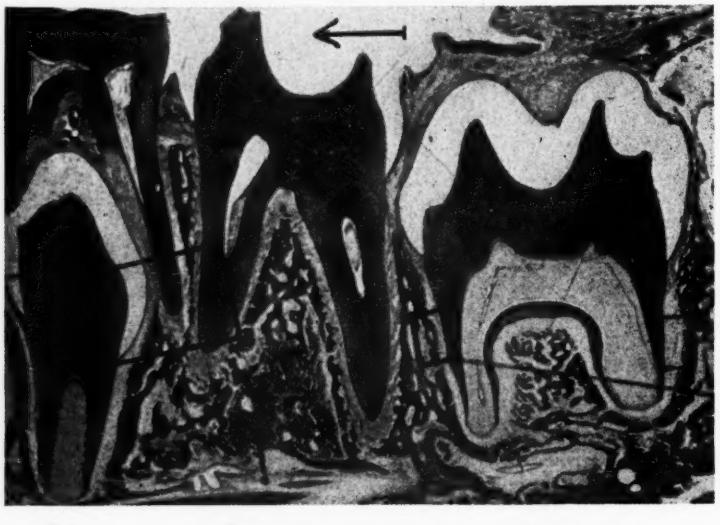


Fig. 3.—Section through second deciduous molar (*sdm*) with premolar germ, first permanent molar (*fpm*), and second permanent molar (*spm*) which were moved in the direction of the arrow (mesially).

buccally (right, in the picture). In this case, where the permanent tooth germ is enclosed between the deciduous tooth roots, it is not surprising to see that the tooth germ participated in the movement. The buccal movement of the premolar germ is evidenced by resorptive processes of the bone on the buccal side of the tooth germ, in the direction of the movement (Fig. 2, *Ok*).

MESIAL MOVEMENT

Another experiment is depicted in Fig. 3, which is a section through the second deciduous molar (*sdm*) with the premolar germ below it, the first permanent molar (*fpm*) and the (unerupted) second permanent molar (*spm*). The first permanent molar was moved mesially (left, in illustration). An examina-

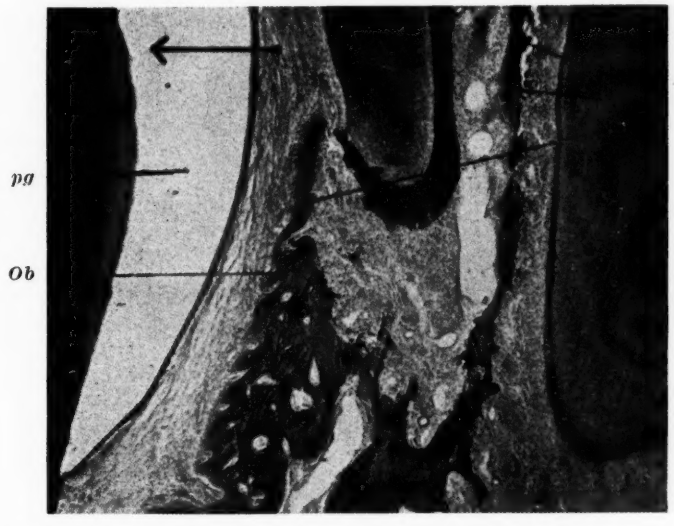


Fig. 4.—Larger magnification of area 1 from Fig. 3. *Ok*, osteoclasts; *Ob* layer *of* osteoblasts; *pg*, premolar germ.

Fig. 5.—Section through second deciduous molar (*sdm*) with premolar germ, first permanent molar (*fpm*), and second permanent molar germ (*spmg*) which were moved in direction of arrow (distally).

tion of area 1 of Fig. 3 in higher magnification (Fig. 4) reveals the changes occurring in the bone posterior to the premolar germ (*pg*). Here we find osteoblasts (*Ob*) forming a new layer of bone on the mesial surface of the trabeculae (in the direction of the movement), while resorption takes place on

the distal side of the trabeculae (*Ok*). This proves that the tooth germ itself is moving in a mesial direction.

Similar histologic changes can be seen around the unerupted second molar, which again indicates that this germ also is following the orthodontically moved first molar mesially.

DISTAL MOVEMENT

The next experiment deals with the distal movement of teeth. The maxillary first permanent molar (Fig. 5, *fpm*) was moved distally (right, in picture), and the reaction on the second permanent molar germ (*spmg*) was studied. Under larger magnification (Fig. 6) it is noticed that the bone lamella between first and second molars is resorbed on the side facing the first molar as this

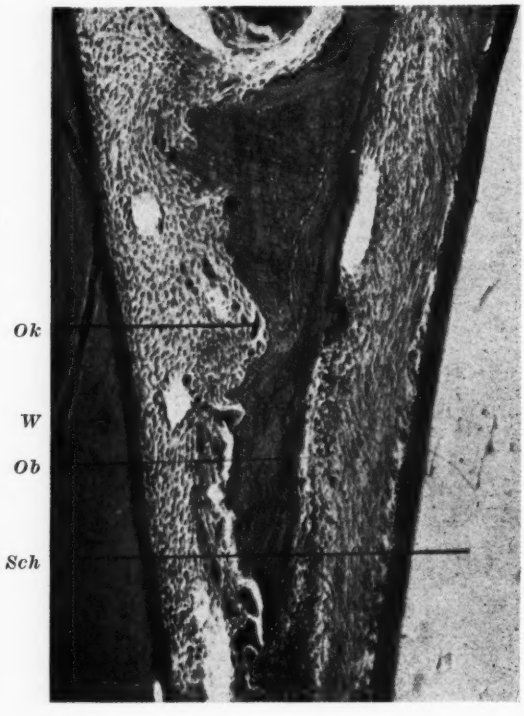


Fig. 6.—Larger magnification of area 2 from Fig. 5. Mesial side of second permanent molar germ; *Sch*, enamel of germ; *Ob*, layer of osteoblasts; *W*, root of first permanent molar; *Ok*, osteoclasts.

tooth is pressing distally (Fig. 6, *Ok*). At the same time, new bone is formed on the distal side of the lamella (*Ob*), facing the second molar germ, as a sign that the germ is also moving distally. This fact is further evidenced by the resorption of bone taking place on the distal side of the second molar tooth germ.

TIPPING OF TEETH

A decided tipping action of the first molar (Fig. 7, *fpm*) mesially occurred in one experiment in which the cap probably became uncemented and loose. The tipping of this tooth mesially is evidenced by signs of bone resorption in area 3, on the mesial side of the tooth crown, and by a simultaneous new bone forma-

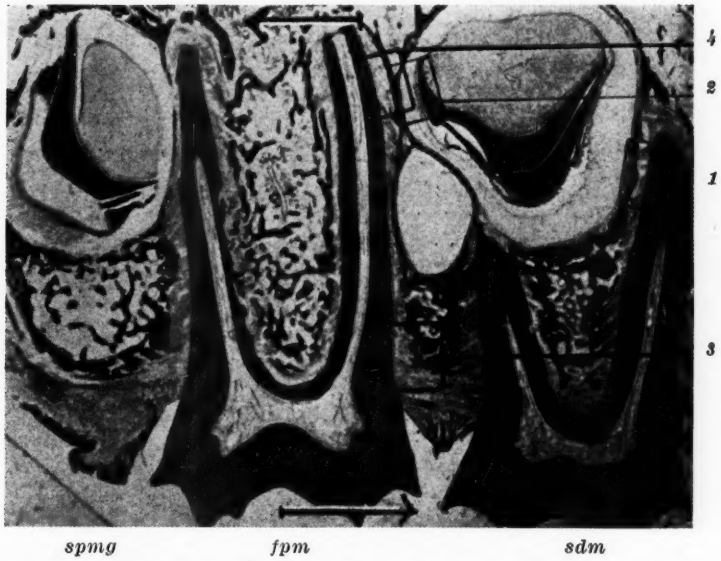


Fig. 7.—Section through second permanent molar germ (*spmg*), first permanent molar (*fpm*), and second deciduous molar (*sdm*) with its premolar germ. The first permanent molar was badly tipped, its crown moving mesially (indicated by arrow) its root moving distally (arrow). The premolar germ followed the tooth root distally.

Fig. 8.—Bodily movement of a deciduous canine buccally (in direction of arrow) with the permanent canine germ (*pcg*) lying on the lingual side of its root. The tooth germ moves together with the deciduous canine root buccally (in direction of arrow), though it is not subjected to any moving force, either directly or indirectly.

tion in area 4, on the mesial side of the apex of the tooth. The premolar germ, lying close to the distally tipping root of the first molar, also moves distally, as the histologic examination of the bone around it reveals. In this way the tooth germ moved distally, while the crown of the first molar moved mesially; in other words, it moved in a direction opposite to that in which the force was applied. This happened because the orthodontically moved tooth tipped badly during the movement.

INDIRECT MOVING OF TOOTH GERMS

In some instances, permanent tooth germs do not lie between deciduous roots, but only next to them. Such a case can be examined in Fig. 8, which

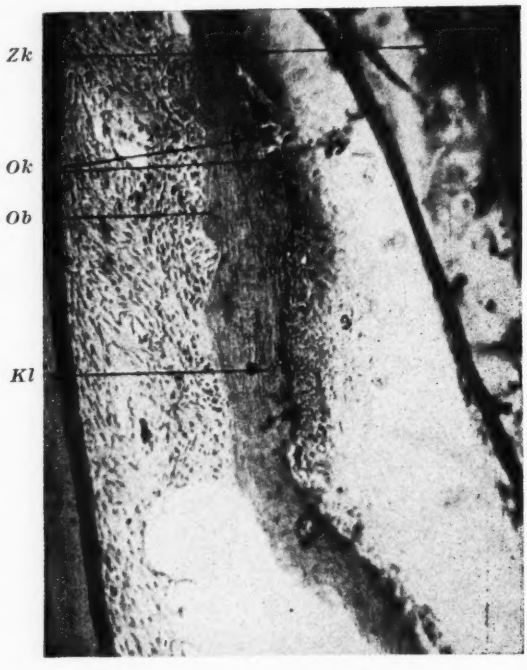


Fig. 9.—Larger magnification of area 1 from Fig. 8. *Kl*, bone lamella between deciduous canine and permanent canine germ; *Ok*, osteoclasts; *Zk*, permanent canine germ; *Ob*, osteoblasts. The tooth germ moves together with the deciduous canine root buccally.

shows a deciduous canine (*dc*), with the permanent canine germ (*pcg*) lying lingually to its root. The deciduous canine was moved bodily in a buccal (left, on picture) direction. A larger magnification of area 1 from this figure indicates (Fig. 9) that the permanent canine germ (*pcg*) also moved buccally, though there was no possibility of a direct pressure on it. The bone lamella lying between the deciduous and the permanent tooth is being resorbed on its lingual side (*Ok*), and new bone is formed on its buccal side (*Ob*), demonstrating the buccal movement of the tooth germ. The permanent canine germ participates, therefore, in the tooth movement, though neither directly nor indirectly subjected to any moving force.

CONCLUSIONS

1. Tooth germs which lie between deciduous roots move with these roots.

2. Tooth germs which lie close to deciduous tooth roots in the direction of the force move in the same direction.

3. Tooth germs which lie next to deciduous tooth roots not in the direction of the force also follow the roots in their movement even when the roots are moved away from the germs.

4. If the deciduous tooth root, due to excessive tipping, moves in opposite direction from the tooth crown, the germ also follows the root in the opposite direction, a fact which should be carefully considered in treatment.

E. N.

The Forum

Articles for this department should be sent to Dr. Albert H. Ketcham and Dr. William R. Humphrey, 1232 Republic Bldg., Denver, Colo.

A Resolution Adopted by the Southern California Section of the Pacific Coast Society of Orthodontists

WHEREAS, the practice of orthodontics in any community is dependent upon the standards and conduct of the majority of those who represent it, and

WHEREAS, the uncertainty of the times, as well as the large influx of new practitioners in this special field, have resulted in much confusion, and

WHEREAS, lower standards of practice, poor economic returns, and lack of cooperative effort promise to reduce the practice of orthodontics here to the plane of low grade dental practice; therefore be it

Resolved, That the Southern Section of the Pacific Coast Society of Orthodontists appoint a special committee to be known as the Committee on the Conduct of Orthodontic Practice, whose duty it shall be to make a study of conditions in orthodontic practice in this Section, conduct hearings at such times as are essential, receive complaints of instances in which practitioners fail to exercise that degree of good taste essential to the prestige of our specialty, to present before this body, with or without their recommendations, plans for the improvement of orthodontic practice in Southern California, to strive to place before the organization objectives calling for cooperative effort, to recommend censure to those who fail to maintain the higher traditions of the specialty, and otherwise to work for the benefit of orthodontics through the molding of public opinion; and be it further

Resolved, That this committee shall consist of the Chairman and Secretary of the Southern California Section of the Pacific Coast Society of Orthodontists, the Southern California member of the Board of Directors of the Pacific Coast Society of Orthodontists, and an additional member of their own choosing, should it be found advantageous to enlarge the committee.

Befogging the Issue to the Dental Profession

The series of communications and editorials appearing in the *Dental Items of Interest* under the heading "Proprietary Schools and Their Relation to Specialization in Dentistry" is grossly befogging the true issue.

The proprietary school, like any unit of professional activity, should be reported relative to ascertaining a reliable evaluation of its activity. It should

be noted that during the past thirty years of American dentistry, the outstanding majority of the members of the American and sectional societies of the United States have emanated from the proprietary schools of orthodontia, both in numbers and in prominence of professional standing; that the comparatively few in number who have entered the specialty from the university postgraduate courses offer no evidence of having received superior training. Also it has been the history of orthodontic teaching to attempt the university route first and to find that atmosphere so in conflict with the ideals and modes of presentation as to inhibit cooperative endeavor in conducting orthodontic education. In the earliest case, the late Dr. Angle found it necessary to break with the University of St. Louis in order that he might teach as he saw fit.

The proprietary school is but one of many avenues from which professional instruction emanates to contribute to the extensive activity of the men who seek advanced knowledge in the various branches of dentistry. In fact, as at no former time, we note increased activity throughout the country of the various state, city, and local dental organizations forming society study clubs for postgraduate courses. We can scarcely conceive of reverting to the old order wherein all undergraduate instruction emanated from a preceptor with the elimination of all dental schools; equally is it difficult to conceive of accepting a new order wherein all fountains of learning shall be shut down after issuance of the dental degree, except that the dentist shall reenter these halls of learning for any instruction.

The proprietary school is singled out unjustly as being the principal contributing factor in offering instruction by short term courses for the explicit purpose of entitling a man to "set up" as a specialist. The decision of any licentiate in dentistry to practice as a specialist is a moral issue resting with the individual. He has set himself up as a specialist when and if he so desires to accept the moral risk involved in claiming special knowledge; and this knowledge has been obtained in consequence of special aptitude, personal study, private tutoring, and attending courses of various lengths in universities, proprietary schools, society postgraduate courses, etc. It is to be noted, however, that in past years the majority of specialists in orthodontia did deem it advisable to finish with a course at a proprietary school of orthodontia.

The proprietary school has no standing or recognition within the legal requirements for the practice of dentistry in any of its branches, nor would a degree or diploma of such issue give testimony of adequate training or special ability. It would make known that the individual had spent such time in attendance of classes specially pertaining thereto. This is the status, likewise, of all courses of instruction so emanating today as postgraduate courses in orthodontia, university courses included, even though the Master's degree is granted; there has been no course offered which has been officially recognized as offering adequate instruction for the preparation of a specialist; nothing to certify that he possesses adequate, expert knowledge or ability to justify him in so "setting up."

Proprietary as well as university schools infer the preparation of the candidate, upon completion of their courses, to enter upon the practice of orthodontia with adequate training in the fundamentals to practice said branch safely. Likewise, this is as far as training extends in all undergraduate work, according to the report of the Dental Educational Council of America, which states explicitly: "The dental graduate should be prepared to begin with adequate safety the practice of dentistry, but experience is essential for his proper development. It does not aim to graduate an expert at the beginning of his career, but rather so to equip him that he may grow, through experience, to the attainment of this standard of excellence."

The true issue, then, is, "dental educational courses and their relation to specialization." This is a vital issue in consequence of changes and advancements relative to undergraduate as well as postgraduate instruction in dentistry and medicine. The issue of specialization today presents a complicated structure in the light of discussion of educational requirements for the practice of a branch of dentistry in general practice. Formerly, under the tutelage of Angle, Dewey, and International Schools, the majority of their graduates "set up" as specialists and practiced orthodontia exclusively. Conditions, however, have changed in recent years. From economic reasons, as well as the naturally enlarged scope of activity which has been the constant trend of general practice, orthodontia is now practiced in some twenty thousand offices in the United States. There are about six hundred members listed as claiming to be "specialists."

Therefore it should be recognized that all the while the dental licentiate has been legally entitled to practice orthodontia; that by virtue of the specific definitions of the various states, which define what constitutes the practice of dentistry, the practice of orthodontia is an integral part of that profession so defined and, what is more specific, the entire membership has been required to pass state board examinations which included the subject of orthodontia for license to practice dentistry. The dental profession is now taking advantage of its inherent rights to inculcate the "sins of commission" instead of remaining satisfied with the "sins of omission," by practicing orthodontic procedure, at least in certain phases, in connection with general practice. Under the present status, it is not a matter of such great moment to the practitioner whether he is rated as a specialist or not; whether the sign in the window or on his card reads "Orthodontist" or "Orthodontics" except that, in the technicalities of the law, the former term might impose greater responsibilities on the shoulders of the defendant in the face of a malpractice charge.

In accordance with the increased requirements formerly from a preliminary high school education and three dental years now to two years of liberal arts and four dental years with the recognized needs for special service still requiring additional training as postgraduate work, it is to be expected that increased requirements will also be deemed essential by the educational councils for postgraduate courses which will be "becoming the universities" with which they are associated. Educational requirements, however, in the stages of advancement are not retroactive in affecting the contemporary membership; and it would

not be judicious to shut off all sources of orthodontic instruction to the profession except that which would emanate from newly formulated plans for improvement in orthodontic courses according to their evolvement.

To attempt to limit the practice of orthodontia to those who have received what may be deemed adequate training as befitting a specialist by certain proponents of the university system is analogous to the proposal to raise the dental educational requirements so that the dental degree can be attained only after the medical degree.

This would create the superdentist, and all ordinarily trained professional brethren would be his "technical assistants." It is most laudable that specialized work in the nature of research should be carried on in the university postgraduate schools and in the proprietary schools. Let there be light and unlimited zeal in unlocking the secrets of nature relative to the complexities of growth and development, so interesting and valuable to the practice of orthodontia; but the research workers are few in number, and they are rarely active practitioners, while the number of children in need of orthodontic services is apparently increasing.

From an educational standpoint, the status of orthodontia is that of a vital integral part of the dental profession, the prime object of which is the same as that of dentistry in general, the scope of which is as intricate and broad as the modern biologic concept implies, embracing a study of the various phenomena of the processes of life itself. Such a scope calls for an inclusion of research in its advancement, as previously stated. This branch of the profession, however, cannot be longer regarded as a science and an art set apart as an entity to be studied for its development; rather it is decidedly essential to correlate properly its basic principles with the various subdivisions of the healing art.

Fundamental orthodontic principles are intimately intertwined with operative procedure in general practice, whether it be for child or adult; whether the nature of the services be preventive or corrective. Children's dentistry, embracing as it does preventive or minor orthodontia and, in a larger sense, orthodontia proper, is indissolubly linked with this branch of dentistry. Many prosthetic restorations could be placed under vastly more satisfactory conditions if orthodontia preceded, as a correlation in practice, the placing of such restorations.

Advancement in dentistry is to be reflected through an increased interest and activity on the part of the membership in orthodontics, and it behooves members who are practicing this branch exclusively to cooperate by assisting in the educational enlightenment of those who are interested in correlating its basic principles in general practice. Dental societies should be organized for the specific purpose of disseminating knowledge which will inculcate a sense of responsibility wherein the practitioner will not attempt the treatment of complex cases through advice from a commercial laboratory.

The result of such activities, whether the practitioner will practice orthodontia exclusively, partially, or only correlate principles in general practice, is a matter of individual aptitude and desire with the moral risk in attempting

only that which one feels capable of undertaking. A natural educational development for the treatment of the complex cases should evolve from experience in treatment of the simpler conditions and from work in the preventive field. Considerable intensive training should precede the acceptance of complex cases. This instruction may properly emanate according to the standard of work given, the manner and facilities for presentation, the length of course, etc. The source of instruction should not be considered, since it is the welfare of the public that is to be considered; and it is of vital importance to give honest, unbiased opinion of the qualifications of the men who may begin with adequate safety the practice of orthodontia. The preparation should "so equip him that he may grow, through experience, to the attainment of the standard of an expert." The essential requirements for this training are herewith concisely characterized, and they are in no wise applicable to university postgraduate courses to the exclusion of others in the promotion of postgraduate development.

The length of the course offered has been the principal point of attack upon the proprietary school. The length of course, presumably common to all proprietary schools, is given as a few weeks, offering a striking contrast to a one-year course on the university plan.

In this instance again the issue is decidedly befogged. The length of course, particularly in the manner of presentation and concentration of material involved, varies with the individual school. Both proprietary and university schools offer courses ranging from two weeks to a year or more. Only a fundamental background is obtainable; the amount of actual experience in operative cases at a university clinic under the guidance of an instructor is superficial and preparatory to the status of an experienced operator, even if two years at half time are spent in the clinic.

It has been my experience, both from the standpoint of originally seeking instruction when discontinuing general practice, as well as in the rôle of a teacher, that the work can be learned to a tremendous advantage in a minimum time on the basis of private tutoring, granting, of course, that the preceptor is a man of ability with years of experience in successful practice. The great requisite in imparting, to a maximum degree, the basic principles in a minimum time, as a background to enter practice safely, is the presentation of the *application* of the collateral sciences in a thoroughly practical manner. The references which have been made regarding the time necessary to review such subjects as anatomy, physiology, embryology, pathology, histology, etc., should be stressed rather regarding the importance of lectures which show the *application* of those subjects to the actual practice of orthodontics; much time has already been spent in learning those subjects.

Only a teacher with years of practical experience can correlate the basic principles of the sciences with those of actual operative procedure. As an example, a review of the origin, insertion, and action of the muscles of mastication, deglutition, and expression is meaningless without a lecture to explain adequately the therapy of muscle training, the principles of retention, the interaction of forces which are productive of balance in occlusal stresses, etc. The subject of

physiology may be reviewed by the student himself, but its principles appear in a new light of understanding and *application* when adequate explanation is made relative to what constitutes physiologic tooth movement. The same is true of histology when graphic illustrations are shown pertaining to the cellular reactions incident to tooth movement. The subjects of anatomy and osteology appear with new meaning regarding detailed structure of the bones of the face, particularly when correlation is made regarding regional structure as affected by stimuli to influence growth and development. The postgraduate orthodontic instruction should be replete with applied science. Investigation will show that the ability of a man to put into practice in operative procedure the application of basic principles which mark him to be a safe operator may depend upon the clearness, the manner, and the thoroughness with which collateral subjects have been presented. The time element involved may amply suffice in the plan as set up by a proprietary school as well as that of the university.

It is essential that a thorough review of orthodontic literature be given with special explanation regarding all phases of orthodontic problems in the light of contributory research. It is essential to elucidate regarding etiology and diagnosis and to present a thorough and well-illustrated rational therapy with the application of a standardized technic in treatment. It should be noted that the latter is as distinctly an individualized trait in the university plan as any proprietary school could possibly aspire to mold it.

It has been duly recognized, as far as the time required to attain mechanical dexterity in the construction of appliances and laboratory construction is considered, that this can be learned in a few weeks.

Let the proprietary and the university schools both invite investigation concerning a consciousness of responsibility involved, the standard of work required, the ideals for which they stand, the service they impart to continue study groups, the understanding possessed by their students of the essentials that constitute an adequate background of the fundamentals, the type of professional men attending their sessions, the type of work being done by the members in their own practice subsequent to the instruction; all these in no small measure should reveal that which is wrought from their handiwork.

—*Edward Mason Griffin.*

The Forum affords an avenue for discussion of controversial subjects, so in this number Dr. Edward M. Griffin presents a subject which should receive careful consideration and full discussion from our readers, for there probably will be a difference of opinion as to the soundness of Dr. Griffin's reasoning.

The question of the relative value of an orthodontic postgraduate course in a proprietary school versus an orthodontic graduate course in a university is a broad one. It is true that many of the older orthodontists who have helped make orthodontic history had, at the beginning, only short courses of instruction in proprietary schools. This was before the days of graduate orthodontic instruction in the university, and they chose the best instruction available. In

addition, they were imbued with the spirit of pioneers, for thirty or thirty-five years ago it was questionable whether one could make a living in the exclusive practice of orthodontia.

Early teachers, like Edward H. Angle, selected their students with the utmost care from many applicants. Angle made it understood that men who had been failures in dentistry would not be accepted, and that only the highest type of dental practitioners need apply for admission to his school. Many of these men absorbed enthusiasm and love for their work from their teacher, and after many years of continued study, as well as practical experience, they are strong exponents of more thorough preparation for the practice of orthodontia.

We believe no one will question the statement that the value of a course of instruction in orthodontia depends a great deal upon the teaching capabilities of the orthodontist who has charge of the course; therefore, it is conceivable that a well-conducted course in a proprietary school might be better than a poorly conducted course in a university. On the other hand, the science of orthodontia is so broad that proper teaching is impossible in a two or three months' course, for even a fair knowledge of the many divergent problems in diagnosis and treatment cannot be imparted to the student in such a short space of time.

There probably is not much question but that the facilities for graduate instruction, including the orthodontic clinics in some of the leading universities, are much better than those of any proprietary school; furthermore, the course of intensive training lasting for one or two years is of much greater benefit than a shorter course of training under equally competent instructors. Another point to consider is that the majority of young men seeking admission to a university graduate course will naturally be better prepared to become orthodontists than in the case of the general practitioners who desire to acquire some knowledge of orthodontia in order to devote part time to this branch of dentistry; therefore, the responsibility resting upon the person conducting a short course in selecting promising students is greater than in the case of the university.

—*A. H. K.*

International Journal of Orthodontia and Dentistry for Children

PUBLISHED THE FIFTEENTH OF EVERY MONTH BY

THE C. V. MOSBY CO., 3523-25 Pine Blvd., St. Louis, Mo.

Foreign Depots—*Great Britain*—Henry Kimpton, 263 High Holborn, London, W. C.; *Australasia*—Stirling & Co., 317 Collins Street, Modern Chambers, Melbourne; *India*—"Practical Medicine," Egerton Street, Delhi; *Porto Rico*—Pedro C. Timothee, Rafael Cordero 68, San Juan, P. R.

Subscription Rates—Single Copies, 75 cents. To any place in United States, Cuba, Porto Rico, Canal Zone, Mexico, Hawaii and Philippine Islands, $7.00 per year in advance. Under foreign postage, $7.40. Volume begins with January and ends with December of each year.

Remittances—Remittances for subscriptions should be made by check, draft, post office or express money order, payable to the publishers, The C. V. Mosby Company.

Contributions.—The editor will consider for publication original communications of merit on orthodontic and allied subjects, which must be contributed solely to this Journal. Original, double spaced, typewritten copy should be submitted.

Opinions—Neither the editor nor the publisher holds himself responsible for the opinions of contributors, nor are they responsible for other than editorial statements.

Reprints—The publishers will communicate with authors regarding reprints upon publication of papers.

Communications—Contributed articles, illustrations, letters, and all other matter pertaining to the editorial department should be addressed to the Editor, Dr. H. C. Pollock, 4482 Washington Blvd., St. Louis, Mo. Manuscripts for the Department of Dentistry for Children should be sent to Dr. W. T. McFall, 106 Forrest Ave., N. E., Atlanta, Ga. All communications in regard to advertising, subscriptions, change of address, etc., should be addressed to the publishers, The C. V. Mosby Company, 3523-25 Pine Blvd., St. Louis, Mo.

Illustrations—Such half-tones and zinc etchings as in the judgment of the editor are necessary to illustrate articles will be furnished when photographs or drawings are supplied by the authors of said articles.

Advertisements — Objectionable advertisements will not be accepted for publication in this Journal. Forms close first of month preceding date of issue. Advertising rates and sizes on application.

Change of Address—The publishers should be advised of change of subscriber's address about fifteen days before date of issue with both new and old addresses given.

Nonreceipt of Copies—Complaints for nonreceipt of copies or requests for extra numbers must be received on or before the fifteenth of the month of publication; otherwise the supply may be exhausted.

Entered at the Post Office at St. Louis, Mo., as Second-Class Matter

Editorial

The Purity Crusaders

ON JANUARY 1, 1915, only a few months after the World War started, the late Martin Dewey stated in the first editorial in the first issue of the *International Journal of Orthodontia,* "In assuming the editorship of the *International Journal of Orthodontia,* I fully realize the responsibilities. The success of this undertaking will depend upon the ability of the publishers to produce a high class journal, and upon the editor and his staff to secure for publication each month meritorious contributions on timely subjects of interest to those engaged in the practice of orthodontia, dentistry, and its allied specialties. . . . We will endeavor to secure contributions of merit from workers in the field of orthodontia and its closely allied specialties regardless of race, color, or previous conditions

of servitude." Under the head of the Journal's endeavor in the same issue, "It would be the purpose to advance the importance of orthodontia as a department of medicine and the healing art," and he added that the pages would be offered to workers in the field "with the hope that humanity might be served and that it might become a factor in arousing interest in child life to such an extent that malocclusion be given as much attention as is bestowed by school inspectors upon adenoids, eyestrain, and mental defects."

Twenty years have passed since the first editor struggled, fought, and worked during the formative years to keep the Journal's head above water. The publishers, facing a deficit, sometimes large and sometimes small, have kept the faith until now after twenty years the Journal points with pride to the record of having published and assembled more orthodontic manuscript than all sources in the world combined. The material has been published in twenty volumes, available in many libraries throughout the world. The publishers continue to provide reference daily to orthodontists who seek to avail themselves of information pertaining to previously published articles on any phase of orthodontia during the past active years of the Journal. During the past twenty years the Journal has acted as official publication for the American Society of Orthodontists, for the British Society for the Study of Orthodontics, and for numerous other important societies in the world.

Notwithstanding the fact that this Journal has published the bulk of orthodontic history of the period, the American Dental Association now says that the INTERNATIONAL JOURNAL OF ORTHODONTIA AND DENTISTRY FOR CHILDREN cannot be exhibited among the regular commercial exhibits at the meeting of the American Dental Association, ostensibly for the reason that at some time since 1931 it has carried within its advertising pages some type of tooth paste advertisement which might not have been approved by the Council on Dental Therapeutics, in spite of the fact that dental journals of the highest standing in America in current issues are carrying advertising within their pages much more objectionable.

Those, however, who know something of the "news behind the news" understand that the indirect reason for this whole incident is the fact that the INTERNATIONAL JOURNAL OF ORTHODONTIA AND DENTISTRY FOR CHILDREN is privately owned by a scientific dental and medical publishing house and not by a formal dental society.

The C. V. Mosby Company, publishers of the INTERNATIONAL JOURNAL OF ORTHODONTIA, may, however, exhibit at the American Dental Association with impunity any or all of its many books and publications of scientific medicine, with the exception of the orthodontia journal.

That is discrimination, plainly the result of the purity crusaders of the Carrie Nation-Volstead type, using the Fellows of the American College of Dentists as a vehicle for God's chosen children to ride the high waves of autocracy in dictating policies pertaining to organized dentistry. It is well known that many of the members of the American College of Dentists regard the movement against any and all dental journals (because they do not happen to be owned by dental societies) as quite infantile in origin and

is construed to be born of ambitious publicity seekers using the American College of Dentistry as a whip to goad along a pet caprice of their own conception, the motive of which is not entirely clear.

The late Will Rogers once said that "every dog should have a certain number of fleas on his back in order that he will not forget that he is a dog." The American College of Dentists is ostensibly an honorary organization comprising a membership of an infinitesimal fraction of one per cent of the membership of the American Dental Association. It should occupy its time exclusively in giving attention to its own fleas and permit the American Dental Association to attend to its own journal parasites if it feels that it has any that require attention.

The ambitious but misguided element of this honorary fraternity might learn something from the precept and example of the American Indian. When he gets inspired, he fortifies himself with a cargo of firewater, arrays himself in splendor with a feather duster and war paint, stands upon his own hilltop and whoops, much to the delight and acclaim of his confreres. On the other hand, when on occasion he leaves the reservation and goes through the same antics, he is soon picked up by the United States marshall and shuffled into the hoosegow for more mature thought and reflection. The Fellows of the American College of Dentists should admonish their most ambitious medicine makers to confine their whoopee to the reservation of the mortar board and the yellow tassel. That would be in better taste, would eliminate the libelous harangue, and would not detract from the caste and formal atmosphere of the organization. A recess in tom-tom beating and serpentine dancing would no doubt be very much welcomed by the tired officers, trustees, house of delegates, thousands of the members of the American Dental Association, and many members of the American College of Dentists as well.

H. C. P.

News and Notes

Southern Society of Orthodontists

The fourteenth annual meeting of the Southern Society of Orthodontists will be held at the Signal Mountain Hotel, Chattanooga, Tenn., on January 27, 28, and 29, 1936.

WILLIAM P. WOOD, JR., Secretary
442 W. Lafayette Street
Tampa, Florida

Southwestern Society of Orthodontists

The fifteenth annual meeting of the Southwestern Society of Orthodontists will be held at the Rice Hotel, Houston, Texas, on October 31, November 1 and 2.

A cordial invitation is extended to all orthodontists and members of the American Society of Orthodontists to attend our session on their way to the meeting of the American Dental Association in New Orleans the following week.

LOUIS S. WINSTON, President
4115 Fannin Street
Houston, Texas

HARRY H. SORRELS, Secretary
Medical Arts Building
Oklahoma City, Okla.

American Society for Promotion of Dentistry for Children

The ninth annual meeting of the American Society for the Promotion of Dentistry for Children will be held at the Roosevelt Hotel, New Orleans, November 4.

A meeting of unusual importance and merit is planned for those interested in dentistry for children.

WALTER T. MCFALL, Secretary & Treasurer
106 Forrest Avenue, N. E.
Atlanta, Georgia

Omicron Kappa Upsilon

There will be a luncheon for members of Omicron Kappa Upsilon at 12 o'clock noon, Wednesday, November 6, at the Roosevelt Hotel, New Orleans. A short program will be provided.

All members who are in attendance at the convention of the American Dental Association are urged to be present.

Dr. F. J. Genre of 6363 St. Charles Avenue is chairman of the local committee.

ABRAM HOFFMAN, Supreme Secretary-Treasurer
311 East Chicago Avenue
Chicago, Illinois

American Dental Assistants Association

The eleventh annual meeting of the American Dental Assistants Association will be held in New Orleans, Nov. 4-8. Headquarters will be at the Bienville Hotel. For further information address

LUCILE S. HODGE, General Secretary,
401 Medical Arts Building,
Knoxville, Tenn.

Association of American Women Dentists

The fourteenth annual meeting of the Association of American Women Dentists will be held November 4 at the Roosevelt Hotel in New Orleans. All women dentists are cordially invited to attend.

ELSIE GERLACH
1838 W. Harrison Street
Chicago, Illinois

American Society of Orthodontists

Following are the committees and the officers of the American Society of Orthodontists for the year 1935-36. The next annual meeting will be held in St. Louis, April 20-23, 1936.

ELECTED COMMITTEES

Board of Censors

HARRY L. HOSMER '36, Chairman
1211 Stroh Bldg.,
Detroit, Mich.

WM. A. MURRAY '37
636 Church St.,
Evanston, Ill.

H. A. ALLSHOUSE, JR. '38
6333 Wyandotte,
Kansas City, Mo.

Education

EARL G. JONES '37, Chairman
185 East State St.,
Columbus, Ohio

F. T. MURLLESS, JR. '36
43 Farmington Ave.,
Hartford, Conn.

B. E. LISCHER '38
4559 Scott Ave.,
St. Louis, Mo.

Budget

O. W. WHITE '38, Chairman
213 David Whitney Bldg.,
Detroit, Mich.

WALTER H. ELLIS '37
Park Lane, 33 Gates Circle,
Buffalo, N. Y.

ERNEST N. BACH '36
1307 Second Nat'l Bank Bldg.,
Toledo, Ohio

Revision of Constitution and By-Laws

OREN A. OLIVER '38, Chairman
Medical Arts Bldg.,
Nashville, Tenn.

FRANK M. CASTO '37
Keith Bldg.,
Cleveland, Ohio

C. C. HOWARD '36
Doctors Bldg.,
Atlanta, Ga.

Legislation

L. J. PORTER '37, Chairman
730 Fifth Ave.,
New York City

A. E. SCOTT '36
135 Stockton St.,
San Francisco, Calif.

T. W. SORRELS '38
906 Medical Arts Bldg.,
Oklahoma City, Okla.

Research

MILO HELLMAN '36, Chairman
57 West 57th St.,
New York City

GEORGE R. MOORE '37
216 S. State St.,
Ann Arbor, Mich.

GERALD FRANKLIN '38
915 Drummond Medical Bldg.,
Montreal, Canada

Publication

G. VERNON FISK '37
818 Medical Arts Bldg.,
Toronto, Canada

O. W. BRANDHORST '36
4500 Olive St.,
St. Louis, Mo.

BROOKS, BELL, JR. '38
Medical Arts Bldg.,
Dallas, Texas

Relief

FRANK C. RODGERS '38, Chairman
Missouri Theatre Bldg.,
St. Louis, Mo.

G. M. ANDERSON '37
831 Park Ave.,
Baltimore, Md.

H. A. STRYKER '36
402 1st Nat'l Bank Bldg.,
Santa Ana, Calif.

APPOINTED COMMITTEES

Program

OREN A. OLIVER, Chairman
Medical Arts Bldg.,
Nashville, Tenn.

FRANK C. RODGERS
Missouri Theatre Bldg.,
St. Louis, Mo.

O. H. BRANDHORST
4500 Olive St.,
St. Louis, Mo.

Local Arrangements

GEORGE H. HERBERT, Chairman
4767 Westminster Place,
St. Louis, Mo.

A. C. MOGLER
4482 Washington Blvd.,
St. Louis, Mo.

ERIC GOLDEN
430 University Club Bldg.,
St. Louis, Mo.

Nomenclature

B. W. WEINBERGER '36, Chairman
119 West 57th St.,
New York City

B. E. LISCHER '37
4559 Scott Ave.,
St. Louis, Mo.

A. LEROY JOHNSON '38
444 Madison Ave.,
New York City

Interrelations

W. E. FLESHER '37, Chairman
Medical Arts Bldg.,
Oklahoma City, Okla.

JOSEPH D. EBY '39
121 E. 60th St.,
New York City

W. W. WOODBURY '38
70 Spring Garden Road,
Halifax, Nova Scotia, Canada

JOHN V. MERSHON '36
1520 Spruce St.,
Philadelphia, Pa.

HUGH G. TANZEY '40
Tower Bldg.,
Kansas City, Mo.

Necrology

HENRY F. HOFFMAN '37, Chairman
700 Majestic Bldg.,
Denver, Colo.

H. C. FERRIS '36
104 East 40th St.,
New York City

HOMER B. ROBISON '38
Rorabaugh-Wiley Bldg.,
Hutchinson, Kansas

Public Relations

B. E. LISCHER, Chairman
4559 Scott Ave.,
St. Louis, Mo.

F. A. DELABARRE
520 Beacon St.,
Boston, Mass.

CHARLES R. BAKER
636 Church St.,
Evanston, Ill.

COMMITTEES FOR ANNUAL MEETING

Ladies' Committee

FRANK C. RODGERS, Chairman
Missouri Theatre Bldg.,
St. Louis, Mo.

JOHN H. BYRNE
3903a DeTonty,
St. Louis, Mo.

THOMAS E. PROSSER
Spivey Bldg.,
East St. Louis, Ill.

Exhibits

JOSEPH H. WILLIAMS, Chairman
3722 Washington Blvd.,
St. Louis, Mo.

L. S. HARRELL
539 N. Grand Ave.,
St. Louis, Mo.

V. A. KIMMEY
3606 Gravois Ave.,
St. Louis, Mo.

Golf and Recreation

L. M. SHANLEY, Chairman
4482 Washington Blvd.,
St. Louis, Mo.

E. V. HOLESTINE
4482 Washington Blvd.,
St. Louis, Mo.

R. L. DAVENPORT
3402 California Ave.,
St. Louis, Mo.

HARRY ALLSHOUSE
6333 Wyandotte,
Kansas City, Mo.

Banquet

HENRY F. WESTHOFF, Chairman
Missouri Theatre Bldg.,
St. Louis, Mo.

J. E. ROOK
5 N. Gore Ave.,
Webster Groves, Mo.

J. P. MARSHALL
7370 Manchester,
St. Louis, Mo.

EARL BEAN
4767 Westminster Place,
St. Louis, Mo.

REORGANIZATION—JOINT COMMITTEE*

American Society of Orthodontists

W. E. FLESHER, Chairman
Medical Arts Bldg.,
Oklahoma City, Okla.

CHARLES R. BAKER
636 Church St.,
Evanston, Ill.

Chicago Association of Orthodontists

J. W. FORD, Chairman
55 East Washington St.,
Chicago, Ill.

HAROLD J. NOYES
30 North Michigan Ave.,
Chicago, Ill.

Great Lakes Association of Orthodontists

ERNEST N. BACH, Chairman
Second Nat'l Bank Bldg.,
Toledo, Ohio

FRANK M. CASTO
Keith Bldg.,
Cleveland, Ohio

New York Society of Orthodontists

HARRY E. KELSEY, Chairman
833 Park Ave.,
Baltimore, Md.

FRANK A. DELABARRE
520 Beacon St.,
Boston, Mass.

Pacific Coast Society of Orthodontists

JAMES D. MCCOY, Chairman
3839 Wilshire Blvd.,
Los Angeles, Calif.

A. E. SCOTT,
135 Stockton St.,
San Francisco, Calif.

Rocky Mountain Society of Orthodontists

W. R. HUMPHREY, Chairman
1232 Republic Bldg.,
Denver, Colo.

OLIVER H. DEVITT
523 Republic Bldg.,
Denver, Colo.

Southern Society of Orthodontists

C. C. HOWARD, Chairman
Doctors Bldg.,
Atlanta, Ga.

OREN A. OLIVER
1101 Medical Arts Bldg.,
Nashville, Tenn.

Southwestern Society of Orthodontists

T. W. SORRELLS, Chairman
907 Medical Arts Bldg.,
Oklahoma City, Okla.

BROOKS BELL, JR.
Medical Arts Bldg.,
Dallas, Texas

OFFICERS

President

H. C. POLLOCK
4482 Washington Blvd.,
St. Louis, Mo.

President-Elect

P. G. SPENCER
1817 Austin Ave.,
Waco, Texas.

Vice-President

JAMES D. MCCOY
3839 Wilshire Blvd.,
Los Angeles, Calif.

Secretary-Treasurer

CLAUDE R. WOOD
Medical Arts Bldg.,
Knoxville, Tenn.

*L. M. Waugh, General Chairman, 576 Fifth Ave., New York City. Committee held over from 1934-35 administration.

EXECUTIVE COUNCIL

H. C. Pollock, Ex-officio
P. G. Spencer, Ex-officio
James D. McCoy, Ex-officio
Claude R. Wood, Ex-officio
Harry L. Hosmer
O. W. White
Oren A. Oliver
Milo Hellman
Earl G. Jones
G. Vernon Fisk
L. J. Porter
Frank Rodgers

Rocky Mountain Society of Orthodontists

At a meeting of the Rocky Mountain Society of Orthodontists held in Denver, May 27, the following men were elected to office for the ensuing year: President, J. L. Carman; vice-president, Oliver Devitt; secretary-treasurer, C. L. Benight. The following are on the Board of Censors: R. L. Gray, A. P. Horton, and F. W. Beasley.

Dr. Herman Becks will be the guest speaker at the meeting October 21, 22, and 23 in Denver. Dr. Becks' subject will be endocrinology. All members of the American Society of Orthodontists are invited to attend this meeting.

Fisher's Orthodontic Directory of the World

The Orthodontic Directory of the World is being revised. The 1936 edition is now in the process of compilation. Those men who are eligible for listing or who have had a change of address since the previous edition should communicate with the editor.

CLAUDE R. WOOD, Editor
608 Medical Arts Bldg.
Knoxville, Tenn.